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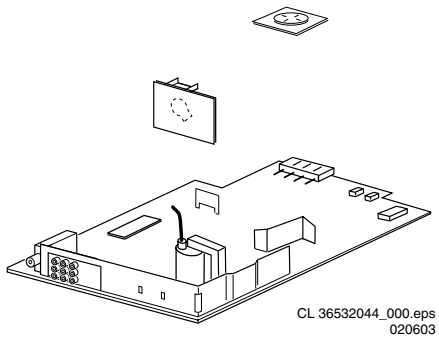

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Service Manual

Contents **Page**

Published by JH 0568 TV Service Printed in the Netherlands Subject to modification EN 3122 785 13932

PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

1.1 Technical Specifications

1.1.1 Reception

Tuning system	:	PLL
Colour systems	:	NTSC M
Sound systems	:	Mono, or
	:	BTSC with SAP
A/V connections	:	NTSC M
Channel selections	:	181 Presets/ Channels
	:	Full-Cable
IF frequency	:	45.75 MHz
Aerial input	:	75 ohm (F type), Coax

1.1.2 Miscellaneous

Audio output	:	Mono: 3 W rms
	:	Bisonic (mono): 2 x 1.5 W rms
	:	Stereo: 2 x 3 W rms
Mains voltage	:	90 - 132 V (± 10 %)
Mains frequency	:	50 / 60 Hz (± 5 %)
Ambient temperature	:	+ 5 to + 45 °C
Minimum air pressure	:	60 kPa (=600 mBar)
Maximum humidity	:	90 %
Power consumption	:	36 W (14") to
	:	50 W (21")
	:	105 W (27")
Standby Power consumption	:	< 3 W

1.2 Connections

1.2.1 Front Connections and Front / Top Control

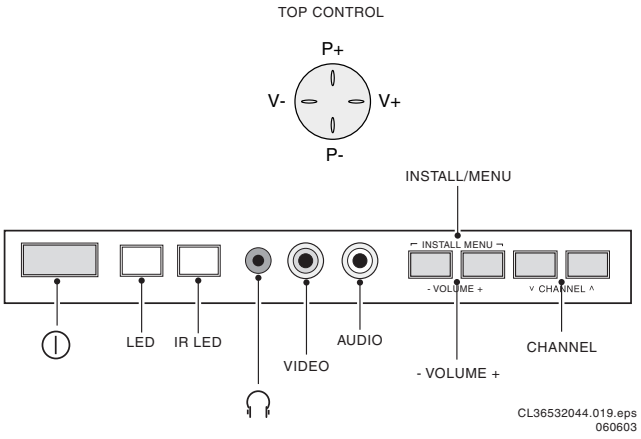

Figure 1-1 Front Connections.

Headphone

1	- Headphone, 3.5 mm	8 - 600 Ω / 4 mW	

Audio / Video In

2	- Video	1 Vpp / 75 ohm	
3	- Audio	Mono 0.2 V rms / 10 kohm	

1.2.2 Rear Connections

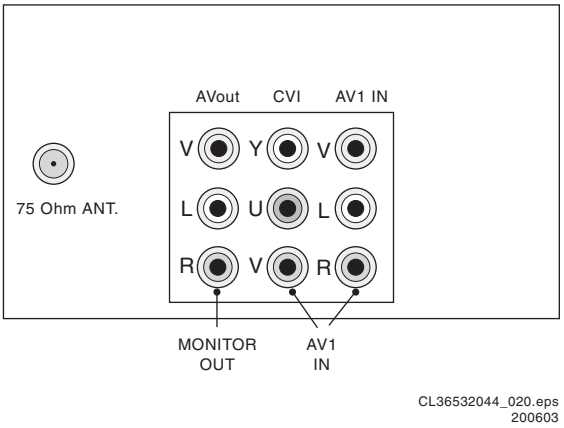

Figure 1-2 Rear Connections.

Monitor Out

1	- Video	1 Vpp / 75 ohm	
2	- Audio	L (0.5 Vrms / 1 kohm)	
3	- Audio	R (0.5 Vrms / 1 kohm)	

AV1 In (YUV)

1	- Y	0.7 Vpp / 75 ohm	
2	- U	0.525 Vpp / 75 ohm	
3	- V	0.525 Vpp / 75 ohm	

AV1 In

4	- Video	1 Vpp / 75 ohm	
5	- Audio	L (0.5 Vrms / 10 kohm)	
6	- Audio	R (0.5 V rms / 10 kohm)	

1.3 Chassis Overview

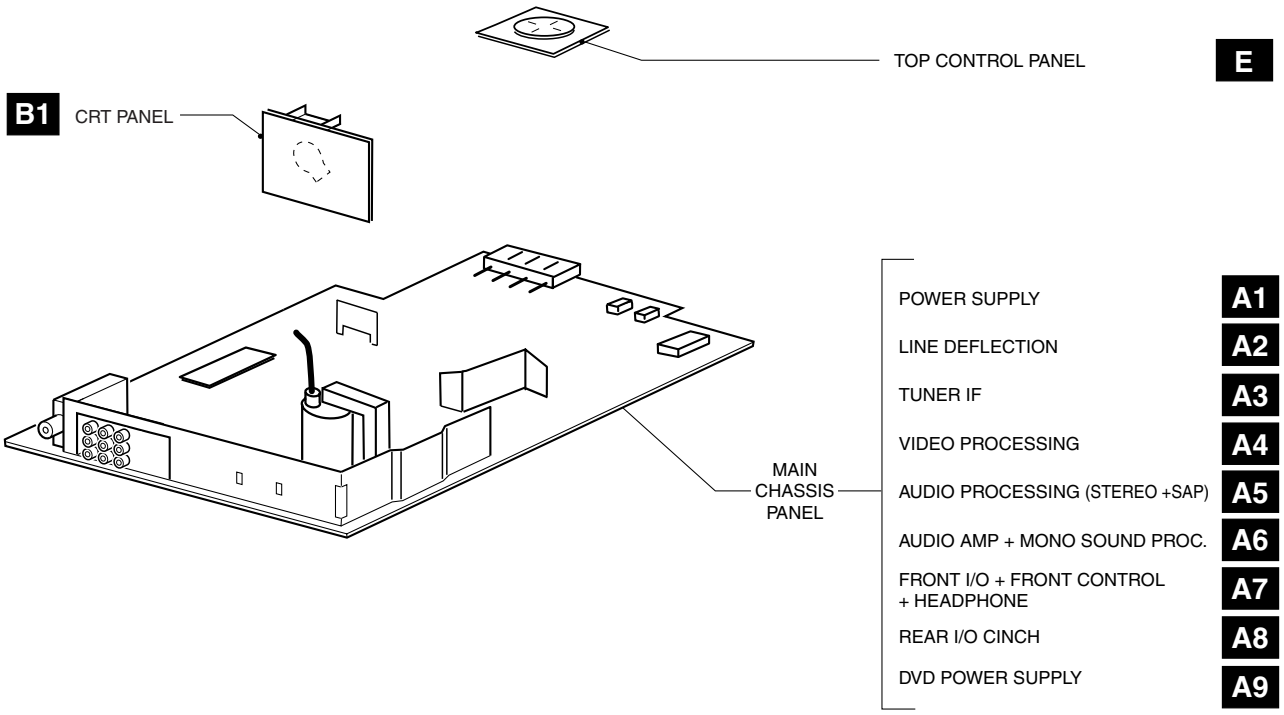

Figure 1-3 Chassis overview

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

2.1 Safety Instructions

Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.
- Wear safety goggles when you replace the CRT.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- General repair instruction: as a strict precaution, we advise you to re-solder the solder connections through which the horizontal deflection current flows. In particular this is valid for the:
  1. Pins of the line output transformer (LOT).
  2. Fly-back capacitor(s).
  3. S-correction capacitor(s).
  4. Line output transistor.
  5. Pins of the connector with wires to the deflection coil.
  6. Other components through which the deflection current flows.

Note: This re-soldering is advised to prevent bad connections due to metal fatigue in solder connections, and is therefore only necessary for television sets more than two years old.

- Route the wire trees and EHT cable correctly and secure them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
  1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
  2. Set the Mains/AC Power switch to the "on" position (keep the Mains/AC Power cord unplugged!).
  3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
  4. Switch "off" the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

2.2 Maintenance Instructions

We recommend a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:

- When a customer uses the set under normal circumstances, for example in a living room, the recommended interval is three to five years.
- When a customer uses the set in an environment with higher dust, grease, or moisture levels, for example in a kitchen, the recommended interval is one year.
- The maintenance inspection includes the following actions:
  1. Perform the “general repair instruction” noted above.
  2. Clean the power supply and deflection circuitry on the chassis.
  3. Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

- In order to prevent damage to ICs and transistors, avoid all high voltage flashovers. In order to prevent damage to the picture tube, use the method shown in figure “Discharge picture tube”, to discharge the picture tube. Use a high voltage probe and a multi-meter (position V_{DC}). Discharge until the meter reading is 0 V (after approx. 30 s).

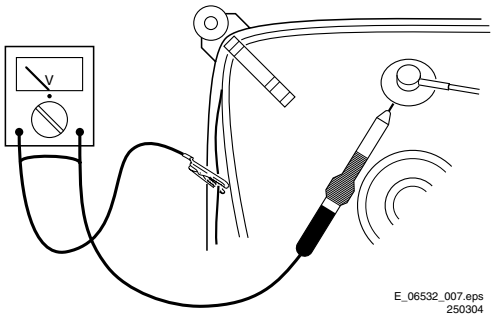

Figure 2-1 Discharge picture tube

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential. Available ESD protection equipment:
  – Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
  – Wristband tester 4822 344 13999.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and prevents circuits from becoming unstable.

2.4 Notes

2.4.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⏋⏌) and without (⏋⏌) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

2.4.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are given in micro-farads (μ= x10^{-6}), nano-farads (n= x10^{-9}), or pico-farads (p= x10^{-12}).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Spare Parts List. Therefore, always check this list when there is any doubt.

2.4.3 Rework on BGA (Ball Grid Array) ICs

General

Although (LF)BGA assembly yields are very high, there may still be a requirement for component rework. By rework, we mean the process of removing the component from the PWB and replacing it with a new component. If an (LF)BGA is removed from a PWB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

Device Removal

As is the case with any component that is being removed, it is essential when removing an (LF)BGA, that the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature reduces the risk of warping the PWB. To do this, we recommend that the board is heated until it is certain that all the joints are molten. Then carefully pull the component off the board with a vacuum nozzle. For the appropriate temperature profiles, see the IC data sheet.

Area Preparation

When the component has been removed, the vacant IC area must be cleaned before replacing the (LF)BGA.
Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be removed with a brush and cleaning agent.
After the board is properly cleaned and inspected, apply flux on the solder lands and on the connection balls of the (LF)BGA.
Note: Do not apply solder paste, as this has been shown to result in problems during re-soldering.

Device Replacement

The last step in the repair process is to solder the new component on the board. Ideally, the (LF)BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers. So as not to damage neighbouring components, it may be necessary to reduce some temperatures and times.

More Information

For more information on how to handle BGA devices, visit this URL: *www.atyourservice.ce.philips.com* (needs subscription, not available for all regions). After login, select “Magazine”, then go to “Workshop Information”. Here you will find Information on how to deal with BGA-ICs.

2.4.4 Lead-free Solder

Philips CE is producing lead-free sets (PBF) from 1.1.2005 onwards.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 5 and 6 refer to the production year, digits 7 and 8 refer to production week (in example below it is 1991 week 18).

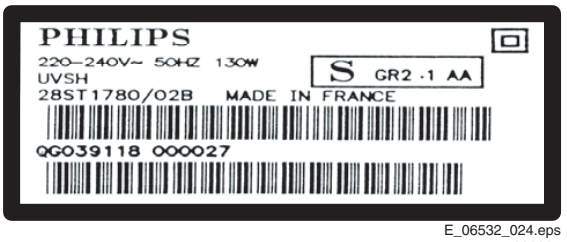

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Figure 2-2 Serial number example

Regardless of the special lead-free logo (which is not always indicated), one must treat all sets from this date onwards according to the rules as described below.

Figure 2-3 Lead-free logo

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
  - To reach a solder-tip temperature of at least 400°C.
  - To stabilise the adjusted temperature at the solder-tip.
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilised at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch “off” unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly **to avoid** mixed regimes. If this cannot be avoided, carefully clean the solder-joint from old tin and re-solder with new tin.
- Use only original spare-parts listed in the Service-Manuals. Not listed standard material (commodities) has to be purchased at external companies.
- Special information for lead-free BGA ICs: these ICs will be delivered in so-called "dry-packaging" to protect the IC against moisture. This packaging may only be opened shortly before it is used (soldered). Otherwise the body of the IC gets "wet" inside and during the heating time the structure of the IC will be destroyed due to high (steam-) pressure inside the body. If the packaging was opened before usage, the IC has to be heated up for some hours (around 90°C) for drying (think of ESD-protection!).
  Do not re-use BGAs at all!
- For sets produced before 1.1.2005, containing leaded soldering tin and components, all needed spare parts will be available till the end of the service period. For the repair of such sets nothing changes.

In case of doubt whether the board is lead-free or not (or with mixed technologies), you can use the following method:

- Always use the highest temperature to solder, when using SAC305 (see also instructions below).
- De-solder thoroughly (clean solder joints to avoid mix of two alloys).

Caution: For BGA-ICs, you **must** use the correct temperature-profile, which is coupled to the 12NC. For an overview of these profiles, visit the website *www.atyourservice.ce.philips.com* (needs subscription, but is not available for all regions)
You will find this and more technical information within the "Magazine", chapter "Workshop information".
For additional questions please contact your local repair help desk.

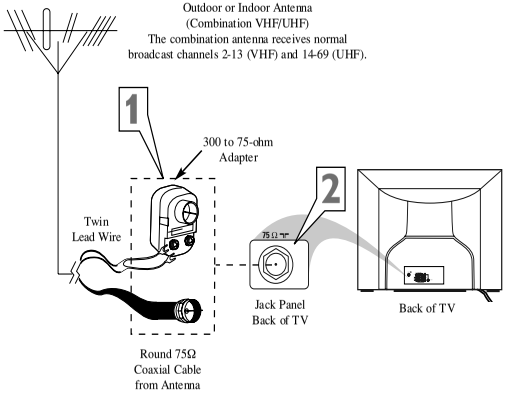
2.4.5 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

BASIC ANTENNA TELEVISION CONNECTION

A combination antenna receives normal broadcast channels (VHF 2–13 and UHF 14–69). Your connection is easy because there is only one 75Ω (ohm) antenna plug on the back of your TV, and that's where the antenna goes.

Antenna Connection:



1 **If your antenna has a round cable** (75 ohm) on the end, then you're ready to connect it to the TV.
If your antenna has flat, twin-lead wire (300 ohm), you first need to attach the antenna wires to the screws on a 300- to 75-ohm adapter.

2 **Push the round end** of the adapter (or antenna) onto the 75Ω (ohm) plug on the back of the TV. If the round end of the antenna wire is threaded, screw it down finger tight.

☑ CHECK IT OUT

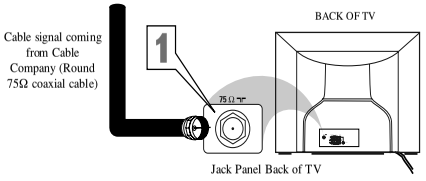
Use the AutoProgram Control to add all available channels into the TV's memory, then press the CH + and – buttons to scroll the channels.

BASIC CABLE TELEVISION CONNECTION

Your Cable TV input into your home may be a single (75 ohm) cable. If so, this connection is very simple. Follow the steps below to connect your cable signal to your new television.

Direct Cable Connections:

Direct Cable Connection:



1 **Connect the open end of the round Cable Company supplied cable** to the 75Ω input on the TV. Screw it down finger tight.

☑ CHECK IT OUT

Use the AutoProgram Control to add all available channels into the TV's memory, then press the CH + and – buttons to scroll the channels.

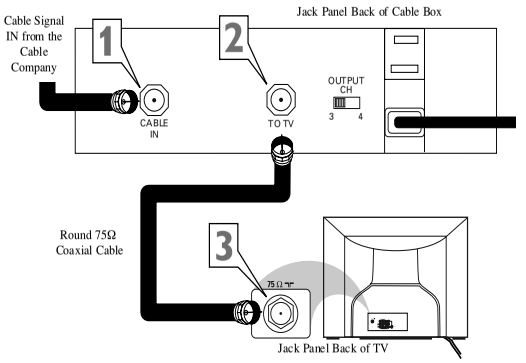
BASIC CABLE BOX/DECODER CONNECTION

If you cable signal uses a cable box or decoder, follow the easy steps below to complete the connection.

Cable Box (w/RF In/Outputs):

This connection will NOT supply Stereo sound to the TV. The sound from the cable box will be mono.

Cable Box Connection (RF Input/Output Only):



1 **Connect the open end of the round Cable Company supplied cable** to the cable signal IN(put) plug on the back of the Cable Box.

2 Using a separate round coaxial cable, **connect one end to the OUT(put) (TO TV) plug on the back of the Cable Box.**

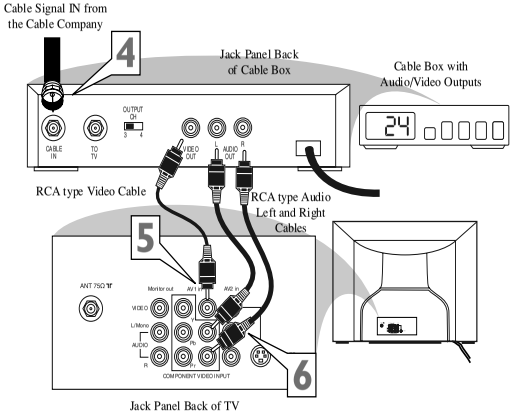
3 **Connect the other end of the round coaxial cable** to the 75Ω input on the back of the television. Screw it down finger tight.

NOTE: Be sure to set the OUTPUT CHANNEL SWITCH on the back of the cable box to CH 3 or 4, then tune the cable box on the TV to the corresponding channel. Once tuned, change channels at the cable box, not the television.

Cable Box (w/Audio/Video Outputs):

This connection will supply Stereo sound to the TV.

Cable Box Connection (with Audio/Video Outputs):



4 **Connect the open end of the round Cable Company supplied cable** to the cable signal IN(put) plug on the back of the Cable Box.

5 Using a RCA type Video Cable, **connect one end of the cable to the Video** (or ANT, *your cable box may be labeled differently*) **Out jack** on the cable box and the other end to the AV1 Video Input on the TV.

6 Using a RCA type Audio Left and Right Cable, **connect one end to the left and right Audio Out L & R jacks on the cable box.** Connect the other end to the AV1 Audio L & R Input jacks on the TV.

NOTE: Use the Channel +, or – buttons on the TV remote control to tune to the AV1 channel for the cable box signal. Once tuned, change channels at the cable box, not the television.

BASIC TELEVISION AND REMOTE CONTROL OPERATION

TELEVISION

1. **Press the POWER button** to turn the TV ON. Or to activate the TV if in Standby Mode.
   Note: You can also press any button on the front of the TV to turn the TV ON.
2. **Press the CHANNEL (P) UP or (P) DOWN** button to select TV channels.
3. **Press the VOLUME ◿ button** to increase the sound level, **or the VOLUME ◺ button** to lower the sound level.

REMOTE CONTROL

4. **Point the remote** control toward the remote sensor window on the TV when operating the TV with the remote.

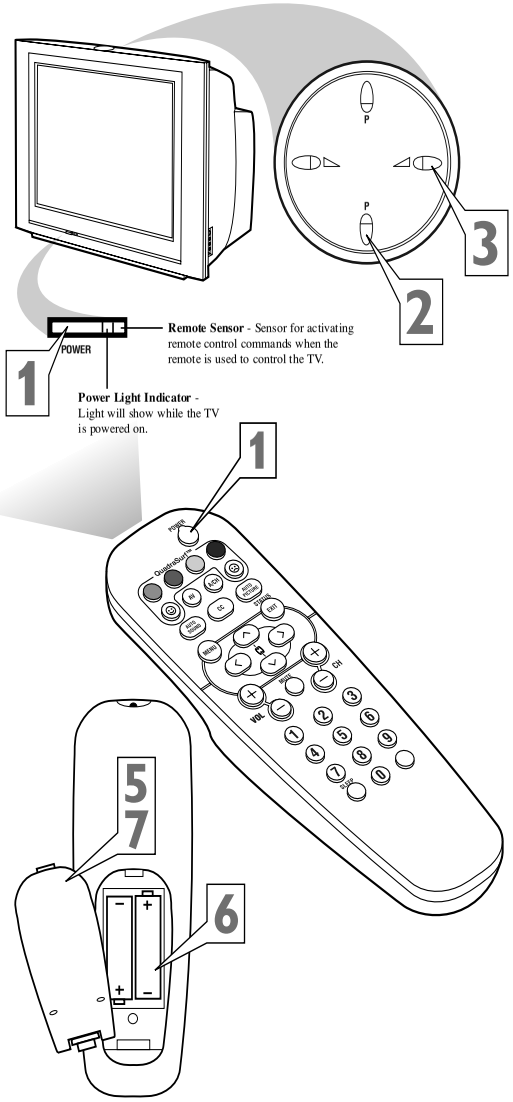
BATTERY INSTALLATION

5. **Remove the battery compartment lid** on the back of the remote.
6. **Place the batteries (2-AA) in the remote**. Be sure the (+) and (-) ends of the batteries line up correctly (inside of case is marked.)
7. **Reattach the battery lid**.

HELPFUL HINT

Remember, the tuned channel number will always briefly appear when the TV is first turned ON (and with channel changes.)

You can also press the STATUS/EXIT button (on the remote) to see what channel the TV is ON.



BASIC TELEVISION AND REMOTE CONTROL OPERATION

TELEVISION

1. **Press the POWER button** to turn the TV ON.
   Note: You can also press any button on the front of the TV to turn the TV ON.
2. **Press the VOLUME + button** to increase the sound level, **or the VOLUME – button** to lower the sound level.
3. **Press the CHANNEL UP ▲ or DOWN ▼** button to select TV channels.

REMOTE CONTROL

4. **Point the remote** control toward the remote sensor window on the TV when operating the TV with the remote.

BATTERY INSTALLATION

5. **Remove the battery compartment lid** on the back of the remote.
6. **Place the batteries (2-AA) in the remote**. Be sure the (+) and (-) ends of the batteries line up correctly (inside of case is marked.)
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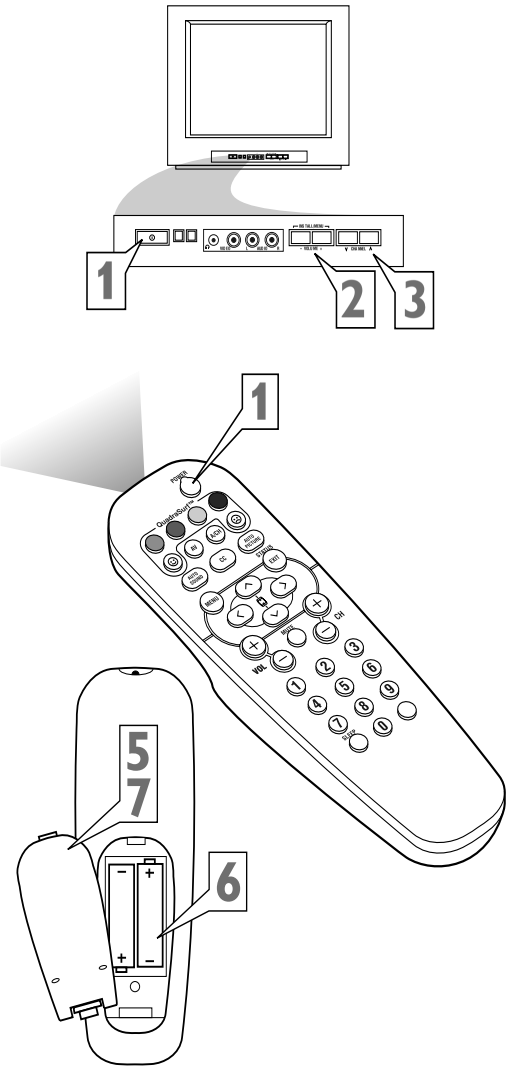


USING THE FRONT AUDIO/VIDEO INPUTS

Audio and Video Front Inputs are available for a quick connection of a VCR, to playback video from a camera or attach a gaming device. Use the AV button on the remote control to tune these inputs.

1. **Connect the video (yellow) cable** from the Video output on the Camera (or accessory device) to the Video (yellow) Input located on the FRONT of the TV.
2. **For Stereo Devices:** Connect the audio cable (red and white) from the Audio Left and Right Outputs on the Camera to a Stereo to Mono adapter. Then plug the single end of the adapter to the Audio In (white) jack on the FRONT of the television.

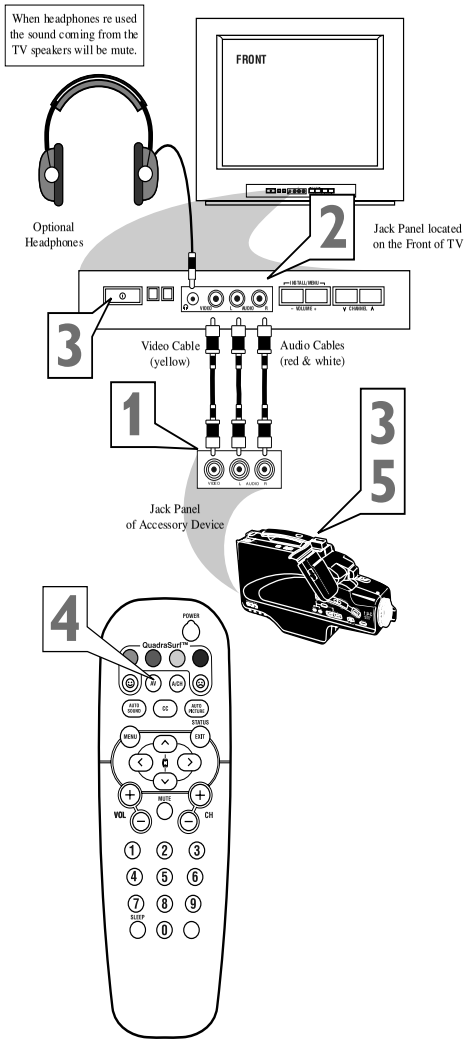
   For Mono Devices: Connect one end of the audio cable from the Audio Out jack on the device to the Audio In (white) jack on the FRONT of the television.
3. Turn the TV and the accessory device ON.
4. **Press the AV button** on the remote control to tune the TV to the side input jacks. "Front" will appear on the TV screen.
5. **Press the PLAY ▶ button** on the accessory device to view playback, or to access the accessory device (camera, gaming unit, etc.).

☑ CHECK IT OUT

Repeatedly pressing the AV button on the remote control will toggle the picture source from the current channel, or Front input jacks.

Note: The Audio/Video cables needed for this connection are not supplied with your TV. Please contact your dealer or Philips at 800-531-0039 for information about purchasing the needed cables.

Front A/V Input Connection:



USING THE CVI (COMPONENT VIDEO INPUT) JACKS

Component Video inputs provide for the highest possible color and picture resolution in the playback of digital signal source material, such as with DVD players. The color difference signals (Pb, Pr) and the luminance (Y) signal are connected and received separately, which allows for improved color bandwidth information (not possible when using composite video or S-Video connections).

1. **Connect the Component (Y, Pb, Pr) Video OUT** jacks from the DVD player (or similar device) to the (Y, Pb, Pr) in(put) jacks on the TV. When using the Component Video Inputs, it is best not to connect a signal to the AV1 in Video Jack.
2. **Connect the red and white AUDIO CABLES** to the Audio (left and right) output jacks on the rear of the accessory device to the Audio (L and R) AV1 in Input Jacks on the TV.
3. **Turn the TV and the DVD (or digital accessory device) ON.**
4. **Press the AV button or the CH +, – buttons** to scroll the available channels until CVI appears in the upper left corner of the TV screen.
5. Insert a DVD disc into the DVD player and **press the PLAY ▶ button on the DVD Player.**

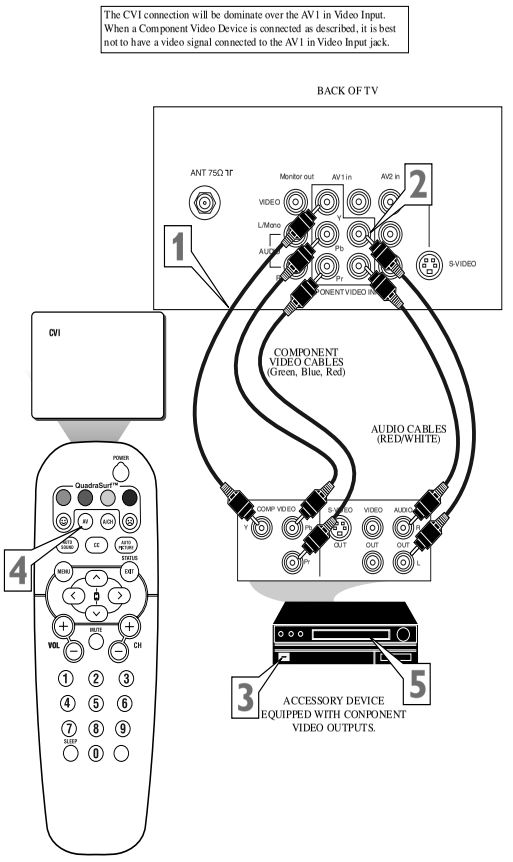
HELPFUL HINT

The description for the component video connectors may differ depending on the DVD player or accessory digital source equipment used (for example, Y, Pb, Pr; Y, B-Y, R-Y; Y, Cr, Cb). Although abbreviations and terms may vary, the letters *b* and *r* stand for the blue and red color component signal connectors, and *Y* indicates the luminance signal. Refer to your DVD or digital accessory owner's manual for definitions and connection details.

☑ CHECK IT OUT

Repeatedly pressing the AV button on the remote control will toggle the picture source from the current channel, then AV1 (or CVI), AV2, SVHS, or currect channel.

Note: The Component Video and Audio cables needed for this connection are not supplied with your TV. Please contact your dealer or Philips at 800-531-0039 for information about purchasing the needed cables.



USING THE AV1 IN OR AV2 IN (INPUT) JACKS

The TV's audio/video input jacks are for direct picture and sound connections between the TV and a VCR (or similar device) that has audio/video output jacks. Both the AV1 and AV2 Input Jack connections are shown on this page, but either one can be connected alone. Follow the easy steps below to connect your accessory device to the AV1 and AV2 in Jacks located on the back of the TV.

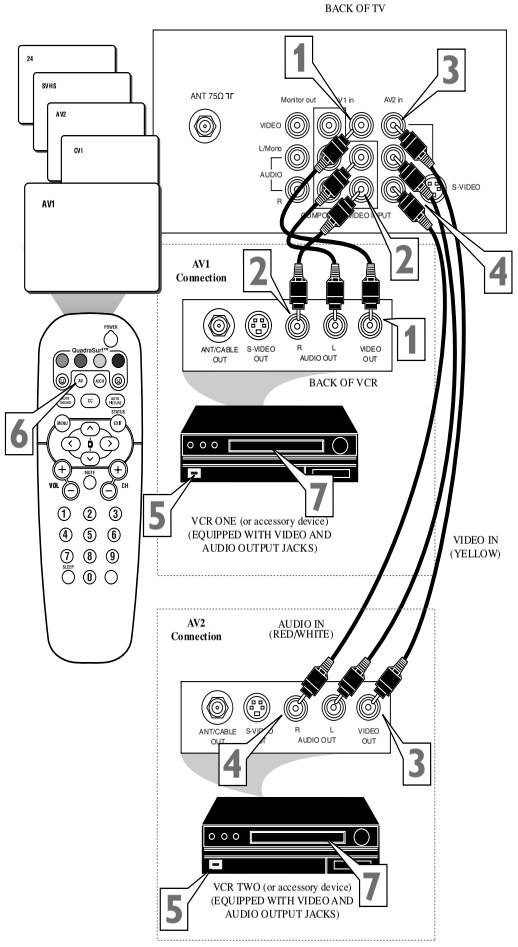
1. **Connect the VIDEO (yellow) cable** to the VIDEO **AV1 in** (or AV2 in) jack on the back of the TV.
2. **Connect the AUDIO (red and white) cables** to the AUDIO (left and right) **AV1 in** (or AV2 in) jacks on the rear of the TV.
3. **Connect the VIDEO (yellow) cable** to the VIDEO OUT jack on the back of the VCR (either one or two) or accessory device being used.
4. **Connect the AUDIO (red and white) cables** to the AUDIO (left and right) OUT jacks on the rear of the VCR (either one or two) or accessory device being used.
5. **Turn the VCR (either one or two) or accessory device and the TV ON.**
6. **Press the AV button** on the remote control to select the AV1 channel for accessory device number one, or the AV2 channel for accessory device number two. AV1 or AV2 will appear in the upper left corner on the TV screen depending on the channel chosen.
7. With either of the VCRs (or accessory devices) ON and a prerecorded tape (CD, DVD, etc.) inserted, **press the PLAY button** to view the tape on the television.

☑ CHECK IT OUT

Repeatedly pressing the AV button on the remote control will toggle the picture source from the current channel, then AV1 (or CVI), AV2, SVHS, or current channel.

Note: The Audio/Video cables needed for this connection are not supplied with your TV. Please contact your dealer or Philips at 800-531-0039 for information about purchasing the needed cables.

NOTE: Repeatedly pressing the AV button on the remote control will toggle the picture source from the current channel, then the AV1 channel (or CVI channel), then the AV2 channel, then the S-Video (SVHS) channel, then back to the current channel being watched.



USING THE S-VIDEO INPUT JACKS

The S(uper)-Video connection on the rear of the TV can provide you with better picture detail and clarity for the playback of accessory sources such as DBS (digital broadcast satellite), DVD (digital video discs), video games, and S-VHS VCR (video cassette recorder) tapes than the normal antenna picture connections.

***NOTE:** The accessory device must have an S-VIDEO OUT(put) jack in order for you to complete the connection on this page.*

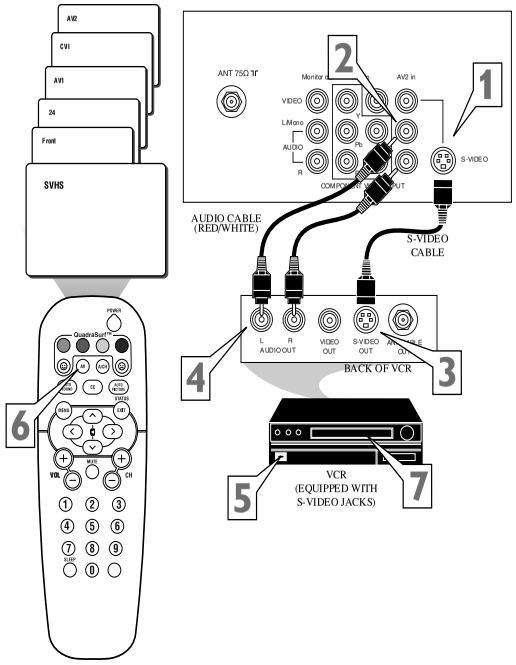
1. **Connect one end of the S-VIDEO CABLE** to the S-VIDEO jack on the back of the TV.
2. **Connect other end of the S-VIDEO CABLE** to the S-VIDEO OUT jack on the back of the VCR.
3. **Connect one end the AUDIO (red and white) CABLES** to the AV2 in AUDIO L and R(left and right) jacks on the rear of the TV.
4. Connect the other ends of the AUDIO (red and white) CABLES to the AUDIO (left and right) OUT jacks on the rear of the VCR.
5. **Turn the VCR and the TV ON.**
6. **Press the AV button** on the remote to scroll the channels until SVHS appears in the upper left corner of the TV screen.
7. Now your ready to place a prerecorded video tape in the VCR and **press the PLAY ▶ button.**

HELPFUL HINT

The S-VIDEO and VIDEO AV2 in(puts) are in parallel. The S-VIDEO input is dominant when in use. If separate video signals are connected to the S-VIDEO and VIDEO AV2 in(puts), the signal from the VIDEO AV2 in(put) will not be usable.

Note: The S-Video and Audio cables needed for this connection are not supplied with your TV. Please contact your dealer or Philips at 800-531-0039 for information about purchasing the needed cables.

NOTE: Repeatedly pressing the AV button on the remote control will toggle the picture source from the current channel, then the AV1 channel (or CVI channel), then the AV2 channel, then the S-Video (SVHS) channel, then back to the current channel being watched.



How to Use the Language Control

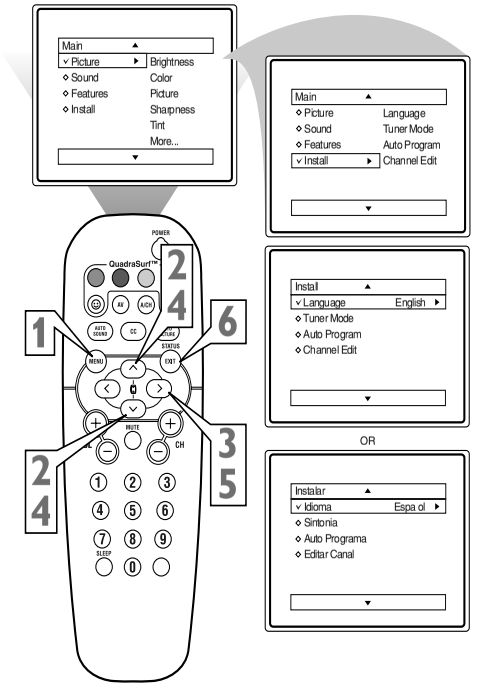
For our Spanish speaking TV owners an on-screen LANGUAGE option is present. With the LANGUAGE control you can set the TV's on-screen menu to be shown in either English or Spanish.

1. **Press the MENU button** on the remote to show the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ buttons** to scroll through the on-screen menu until the word **INSTALL** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the **INSTALL** menu features.
4. **Press CURSOR UP ▲ or DOWN ▼ buttons** to scroll the Install features until the word **LANGUAGE** is highlighted.
5. **Press the CURSOR RIGHT ▶ button repeatedly** to select **ENGLISH** or **ESPAÑOL** (Spanish).
6. **When finished, press the STATUS /EXIT button** to remove the menu from the TV's screen.

Helpful Hint

The Language control only makes the TV's on-screen MENU items appear in English or Spanish text.

It does not change the other on-screen text features such as Closed Caption (CC) TV shows.



How to Use the Tuner Mode Control

The TUNER MODE control allows you to change the TV's signal input to either ANTENNA, CABLE or AUTO mode. It's important for the TV to know what type of signal to look for. (From a Cable TV signal or a normal Antenna signal.) In the AUTO mode, when the AUTO PROGRAM feature is activated, the TV will automatically choose the correct mode.

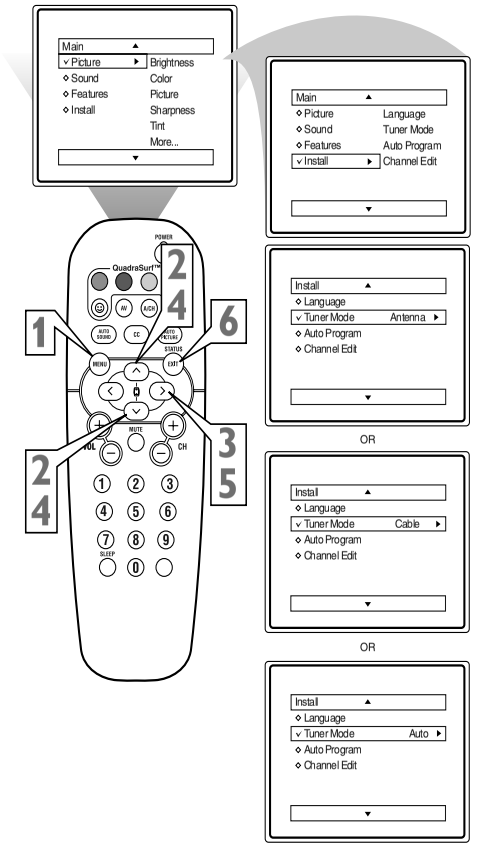
1. **Press the MENU button** on the remote to show the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ buttons** to scroll through the on-screen menu until the word **INSTALL** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the **INSTALL** menu features.
4. **Press CURSOR UP ▲ or DOWN ▼ buttons** to scroll the Install features until the words **TUNER MODE** is highlighted.
5. **Press the CURSOR RIGHT ▶ button** to select either **ANTENNA**, **CABLE**, or **AUTO** mode.
6. **When finished, press the STATUS /EXIT button** to remove the on-screen menu from the TV's screen.

Helpful Hint

When CABLE is selected, channels 1-125 are available.

When ANTENNA is selected, channels 2-69 are available.

When AUTO is selected, the TV will automatically set itself to the correct mode based on the type of signal it detects when the AUTO PROGRAM feature is activated.



How to Automatically Program Channels

Your TV can automatically set itself for local area (or Cable TV) channels. This makes it easy for you to select only the TV stations in your area when the CHANNEL (+), (–) buttons are pressed.

Note: Make sure the antenna or cable signal connection has been completed before AUTO PROGRAM is activated.

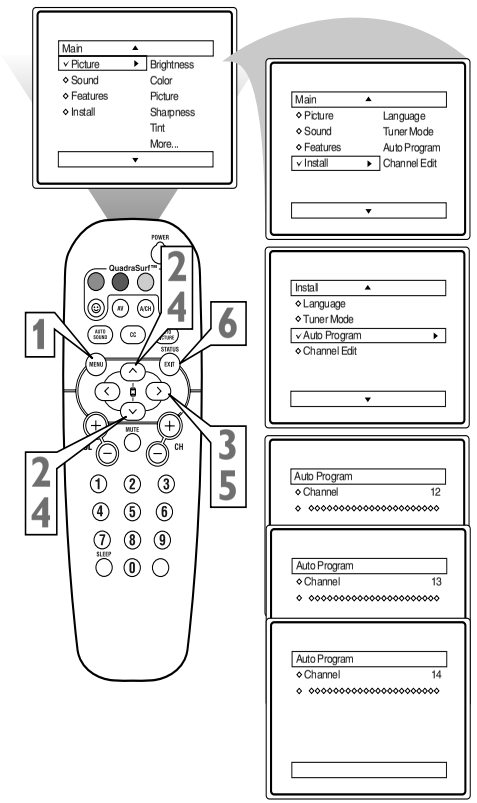
1. **Press the MENU button** on the remote to show the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ buttons** to scroll through the on-screen menu until the word **INSTALL** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the **INSTALL** menu features.
4. **Press CURSOR UP ▲ or DOWN ▼ buttons** to scroll the Install features until the words **AUTO PROGRAM** are highlighted.
5. **Press the CURSOR RIGHT ▶ button** to start the Auto Program scanning of channels. Auto Programming will store all available channels in the TV's memory then tune to the lowest available channel when done.
6. **When finished, press the STATUS /EXIT button** to remove the menu from the TV's screen.

Helpful Hint

When CABLE is selected, channels 1-125 are available.

When ANTENNA is selected, channels 2-69 are available.

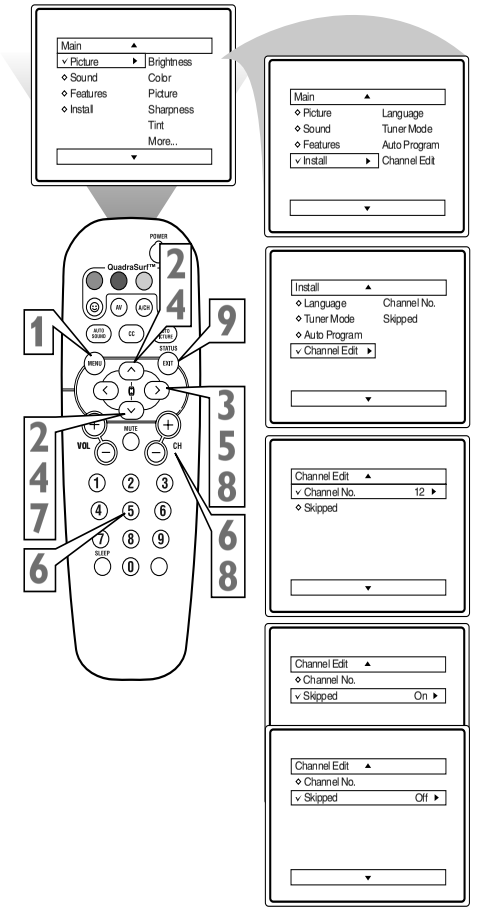
When AUTO is selected, the TV will automatically set itself to the correct mode based on the type of signal it detects when the AUTO PROGRAM feature is activated.



How to Add or Delete Channels

Channel Edit makes it easy for you to ADD or DELETE channels from the list of channels stored in the TV's memory.

1. **Press the MENU button** on the remote to show the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ buttons** to scroll through the on-screen menu until the word **INSTALL** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the **INSTALL** menu features.
4. **Press the CURSOR UP ▲ or DOWN ▼ buttons** to scroll the Install features until the words **CHANNEL EDIT** are highlighted.
5. **Press the CURSOR RIGHT ▶ button** to display the **CHANNEL EDIT** options.
6. **With the CHANNEL EDIT options displayed**, and **CHANNEL NO.** highlighted; enter the channel number (with the **NUMBERED or the CH + or – buttons**) you wish to add (Skipped OFF), or delete (Skipped ON) from the TV's memory.
7. **Using the CURSOR DOWN ▼ button**, scroll the menu to highlight the word **SKIPPED.**
8. **Now use the CURSOR RIGHT ▶ button to toggle between ON or OFF. If ON is selected** the channel is skipped when scrolling channels with the CH + or – buttons. **If OFF is selected** the channel is not skipped when scrolling channels with the CH + or – buttons.
9. **When finished, press the STATUS /EXIT button** to remove the menu from the TV's screen.



How to Use the Picture Adjustment Controls

To adjust your TV picture controls, select a channel and follow the steps shown below:

1. **Press the MENU button** on the remote to display the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ buttons** until the word **PICTURE** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the **PICTURE** menu features.
4. **Press CURSOR UP ▲ or DOWN ▼ buttons** to scroll the Picture features and highlight the control you wish to adjust (Brightness, Color, Picture, Sharpness, Tint, Color Temp., DNR, or Contrast +).
5. **Press the CURSOR RIGHT ▶ or the CURSOR LEFT ◀ buttons** to adjust the selected control or to make selections for the choose control.
6. **Press the CURSOR UP ▲ or DOWN ▼ buttons** to select and adjust other Picture Menu controls.
7. **When finished, press the STATUS /EXIT button** to remove the menu from the TV's screen.

Helpful Hint

BRIGHTNESS: Press the ▶ or ◀ buttons until darkest parts of the picture are as bright as you prefer.

COLOR: Press the ▶ or ◀ buttons to add or eliminate color.

PICTURE: Press the ▶ or ◀ buttons until lightest parts of the picture show good detail.

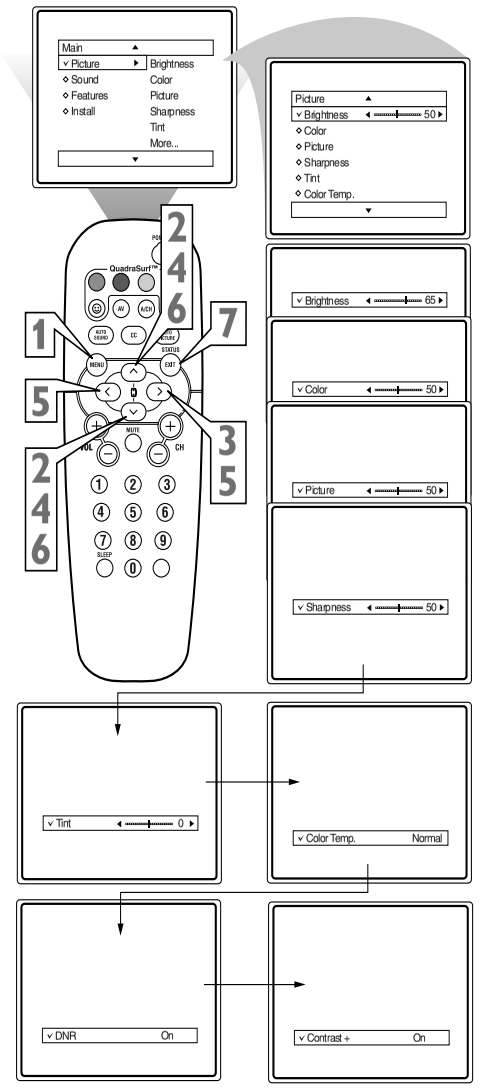
SHARPNESS: Press the ▶ or ◀ buttons to improve detail in the picture.

TINT: Press the ▶ or ◀ buttons to obtain natural skin tones.

COLOR TEMP: Press the ▶ or ◀ buttons to select NORMAL, COOL, or WARM picture preferences. (NORMAL will keep the whites, white; COOL will make the whites, bluish; and WARM will make the whites, reddish.)

DNR: Press the ▶ or ◀ buttons to turn DNR ON or OFF. Dynamic Noise Reduction helps to eliminate "noise" from the picture.

Contrast +: Press the ▶ or ◀ buttons to turn Contrast + ON or OFF. When ON, this control will optimize the picture contrast for improved picture clarity.



How to Use the Sound Adjustment Controls

Besides the normal volume level control, your TV also has Treble Boost, Bass Boost, Balance, AVL (automatic volume leveler), and Sound (Stereo/Mono) controls.

1. **Press the MENU button** on the remote to display the on-screen menu.
2. **Press the CURSOR UP ▲ or CURSOR DOWN ▼ button** until the word **SOUND** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the **SOUND** menu features.
4. **Press the CURSOR UP ▲ or CURSOR DOWN ▼** button to scroll the Sound menu features until the control you wish to change is highlighted (**Treble Boost, Bass Boost, Balance, AVL, or Sound**).
5. **Press the CURSOR RIGHT ▶ or LEFT ◀ button** to turn the adjust or turn the control On or Off.
6. **When finished, press the STATUS /EXIT button** to remove the menu from the TV's screen.

Helpful Hint

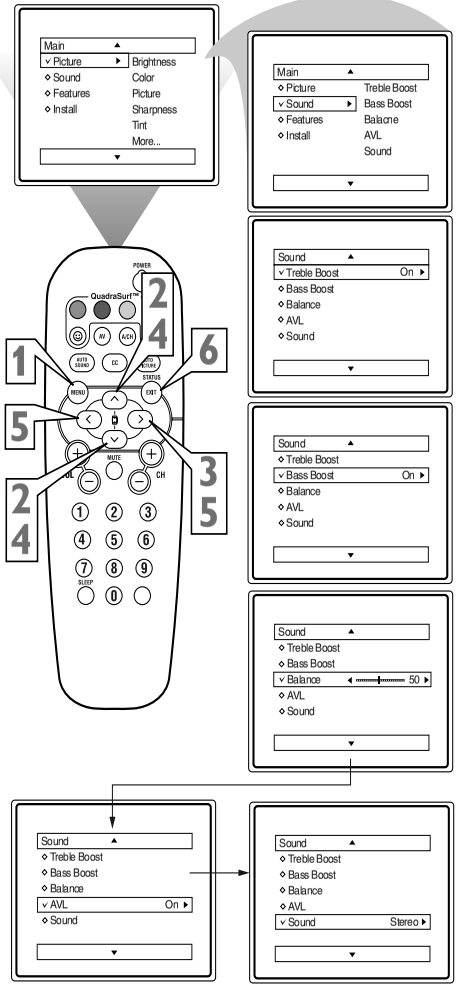
Treble Boost: Press the ▶ or ◀ buttons to turn the control On or Off. When On, the control will enhance the high frequency sounds.

Bass Boost: Press the ▶ or ◀ buttons to turn the control On or Off. When On, the control will enhance the low frequency sounds.

Balance: Press the ▶ or ◀ buttons to adjust the level of sound coming from the left and right speakers.

AVL: (Auto Volume Leveler) **Press the ▶ or ◀** buttons to turn the control On or Off. When On, AVL will level out the sound being heard when sudden changes in volume occur during commercial breaks or channel changes.

Sound: Press the ▶ or ◀ buttons to select between Stereo or Mono settings. Note: If Stereo is not present on a selected show and the TV is placed in the Stereo mode, the sound coming from the TV will remain in the Mono mode.

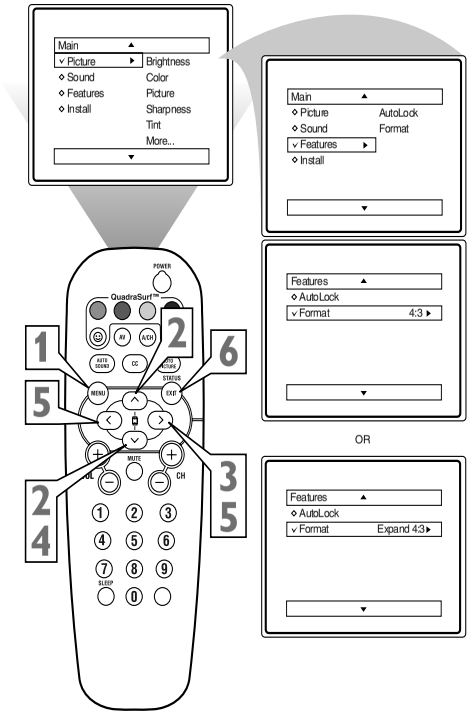


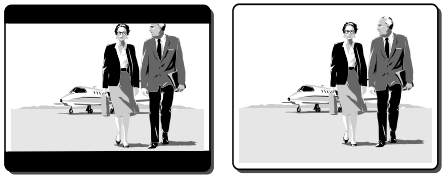
How to Use the Format Control (Expand 4:3)

Many times while watching movies from a DVD player the image is shown in "letter box" format. This is the format that is shown in movie theaters. when shown on a TV screen, the image will have areas of black on top and bottom of the screen. The FORMAT Control can expand the picture to fill the entire TV screen.

1. **Press the MENU button** on the remote to display the on-screen menu.
2. **Press the CURSOR DOWN ▼ button** until the word **FEATURES** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the **FEATURES** menu options (AutoLock or Format).
4. **Press the CURSOR DOWN ▼ button** until the word **FORMAT** is highlighted.
5. **Press the CURSOR RIGHT ▶ or CURSOR LEFT ◀ buttons** to select one of the two options 4:3 or Expand 4:3.
   4:3 - Standard format for the TV.
   Expand 4:3 - Enlarges the picture to fill out the entire screen area, eliminating the "letter box" effect.
6. **When finished, press the STATUS /EXIT button** to remove the menu from the TV's screen.

Note: The Expand 4:3 format can also be activated using the **CURSOR UP or DOWN buttons** when the onscreen menu is not being displayed. Pressing these buttons will toggle the standard 4:3 format and the Expand 4:3 format.





4:3 Expand 4:3

Understanding the AutoLock™ Controls

The AutoLock™ feature is an integrated circuit that receives and processes data sent by broadcasters, or other program providers, that contain program content advisories. When programmed by the viewer, a TV with AutoLock™ can respond to the content advisories and block program content that may be found objectionable (such as offensive language, violence, sexual situations, etc.). This is a great feature to censor the type of viewing children may watch.

***Over the next few pages you'll learn how to block channels** and certain rated programming. Below is a brief explanation of some terms and ratings you will find in the AutoLock feature.*

AutoLock™ offers various BLOCKING controls from which to choose:

Access Code: An Access Code must be set to prevent children from unblocking questionable programming.

Channel Block: Individual channels including the A/V inputs can be blocked.

Clear All: Allows you clear all channels being blocked from your viewing set with the Channel Block Control.

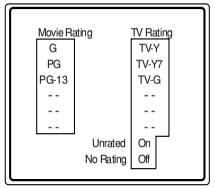
Block All: Allows you to block ALL channels and A/V inputs at one time.

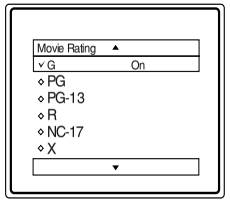
Movie Ratings: Block programming based on ratings patterned by the Motion Pictures Association of America.

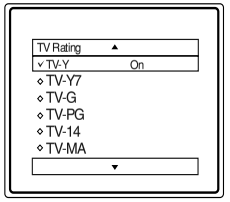
TV Ratings: Block programming based on standard TV ratings set by TV broadcasters.

To learn more about the Motion Picture Ratings and the TV Ratings, refer to the definitions listed on the columns to the right.

Press the STATUS/EXIT button twice to display the AutoLock review screen. This screen shows what is activated within the AutoLock settings.







Movie Ratings
(Motion Picture Association of America)

G: General Audience - All ages admitted. Most parents would find this program suitable for all ages. This type of programming contains little or no violence, no strong language, and little or no sexual dialogue or situations.

PG: Parental Guidance Suggested - This programming contains material that parents may find unsuitable for younger children.) It may contain one or more of the following: Moderate violence, some sexual situations, infrequent coarse language, or some suggestive dialogue.

PG-13: Parents Strongly Cautioned - This programming contains material that parents may find unsuitable for children under the age of 13. It contains one or more of the following: violence, sexual situations, coarse language, or suggestive dialogue.

R: Restricted -This is programming is specifically designed for adults. Anyone under the age of 17 should only view this programming with an accompanying parent or adult guardian. It contains one or more of the following: intense violence, intense sexual situations, strong coarse language, or intensely suggestive dialogue.

NC-17: No one under the age of 17 will be admitted. - This type of programming should be viewed by adults only. It contains graphic violence, explicit sex, or crude indecent language.

X: Adults Only - This type of programming contains one or more of the following: very graphic violence, very graphic and explicit or indecent sexual acts, very coarse and intensely suggestive language.

TV Parental Guidelines
(TV Broadcasters)

TV-Y - (**All children** -- *This program is designed to be appropriate for all children.*) Designed for a very young audience, including children ages 2-6. This type of programming is not expected to frighten younger children.

TV-Y7 - (**Directed to Older Children** -- *This program is designed for children age 7 and above.*) It may be more appropriate for children who have acquired the development skills needed to distinguish between make-believe and reality. This programming may include mild fantasy and comic violence (FV).

TV-G - (**General Audience** -- *Most parents would find this program suitable for all ages.*) This type of programming contains little or no violence, no strong language, and little or no sexual dialogue or situations.

TV-PG - (**Parental Guidance Suggested** -- *This program contains material that parents may find unsuitable for younger children.*) This type of programming contains one or more of the following: Moderate violence (V), some sexual situations (S), infrequent coarse language (L), or some suggestive dialogue (D).

TV-14 - (**Parents Strongly Cautioned** -- *This program contains some material that many parents would find unsuitable for children under 14 years of age.*) This type of programming contains one or more of the following: intense violence (V), intense sexual situations (S), strong coarse language (L), or intensely suggestive dialogue (D).

TV-MA - (**Mature Audience Only** -- *This program is specifically designed to be viewed by adults and therefore may be unsuitable for children under 17.*) This type of programming contains one or more of the following: graphic violence (V), explicit sexual situations (S), or crude indecent language (L).

SETTING UP AN AUTOLOCK™ ACCESS CODE

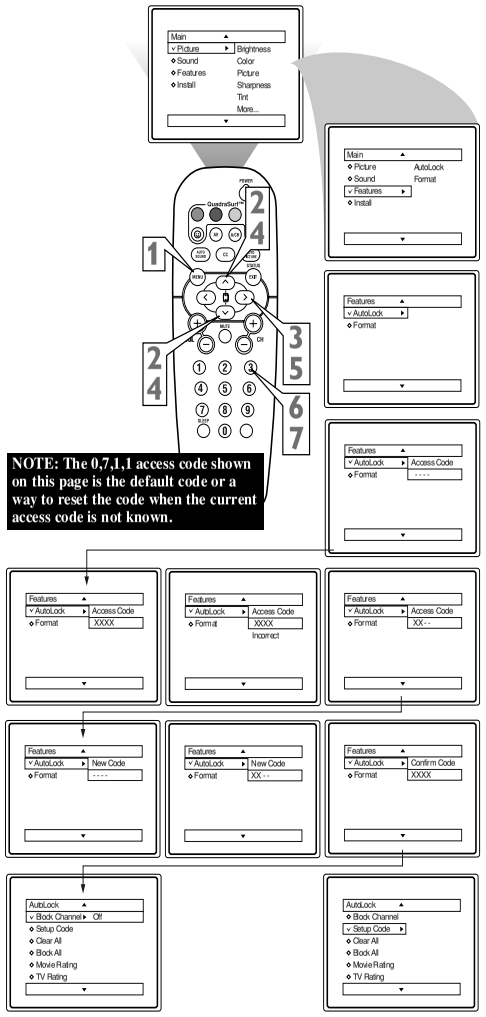
Over the next few pages you'll learn how to block channels and get a better understanding of the rating terms for certain programming.

First, let's start by learning how to set a personal access code:

1. **Press the MENU button** on the remote to display the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ button** until the word **FEATURES** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the FEATURES menu options.
4. **Press the CURSOR UP ▲ or DOWN ▼ button** until the words AUTOLOCK are highlighted.
5. **Press the CURSOR RIGHT ▶ button.** The screen will read, **"ACCESS CODE - - - - ."**
6. **Using the NUMBERED buttons, enter 0, 7, 1, 1. "XXXX"** appears on the Access Code screen as you press the numbered buttons.

   "INCORRECT CODE" will appear on the screen, and **you will need to enter 0, 7, 1, 1 again.**
7. The screen will ask you to enter a "New Code." **Enter a "new" 4 digit code using the NUMBERED buttons.** The screen will then ask you to CONFIRM the code you just entered. **Enter your new code again. "XXXX"** will appear when you enter your new code and then display the AutoLock menu options.

Proceed to the next page to learn more...



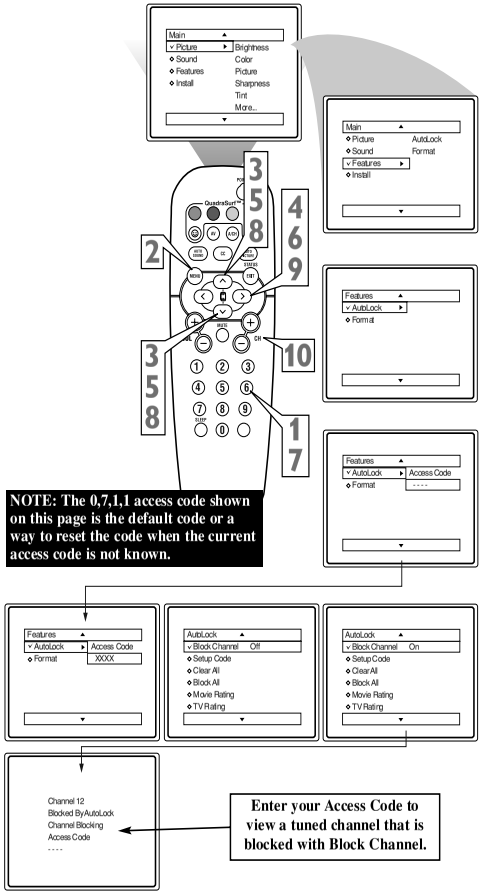
HELPFUL HINT

Parents - it isn't possible for your child to unblock a channel without knowing your access code or changing it to a new one. If your code changes, and you didn't change it, then you know it's been altered by someone else and blocked channels have been viewed.

HOW TO BLOCK CHANNELS

After your personal access code has been set (see previous page), you are now ready to select the channels you want to block out or censor.

1. **Press the NUMBERED (or CH +, –) buttons** to tune the channel you wish to block or censor.
2. **Press the MENU button** on the remote to show the on-screen menu.
3. **Press the CURSOR UP ▲ or DOWN ▼ button** until the word **FEATURES** is highlighted.
4. **Press the CURSOR RIGHT ▶ button** to display the FEATURES menu options.
5. **Press the CURSOR UP ▲ or DOWN ▼ button** until the words AutoLock are highlighted.
6. **Press the CURSOR RIGHT ▶ button. "ACCESS CODE"** will appear on the screen.
7. **Enter the correct access code number. "XXXX"** shows on the Access Code display as you **press the NUMBERED buttons.** AutoLock menu options will be displayed.
8. **Press the CURSOR UP ▲ or DOWN ▼ buttons** until the words **BLOCK CHANNELS** are highlighted.
9. **Press the CURSOR RIGHT ▶ button** to turn blocking ON or OFF for that channel. When ON is selected the channel will be blocked.
10. **Press the CH + or – button** to select other channels you wish to block. Repeat step 9 to block the new channel.



HELPFUL HINT

If you tune to a blocked channel and enter your Access Code to view the channel, ALL blocked channels will be viewable until the TV has been turned off. When the TV is powered back ON, the previously blocked channels will be blocked again.

How to Clear All Blocked Channels at the Same Time

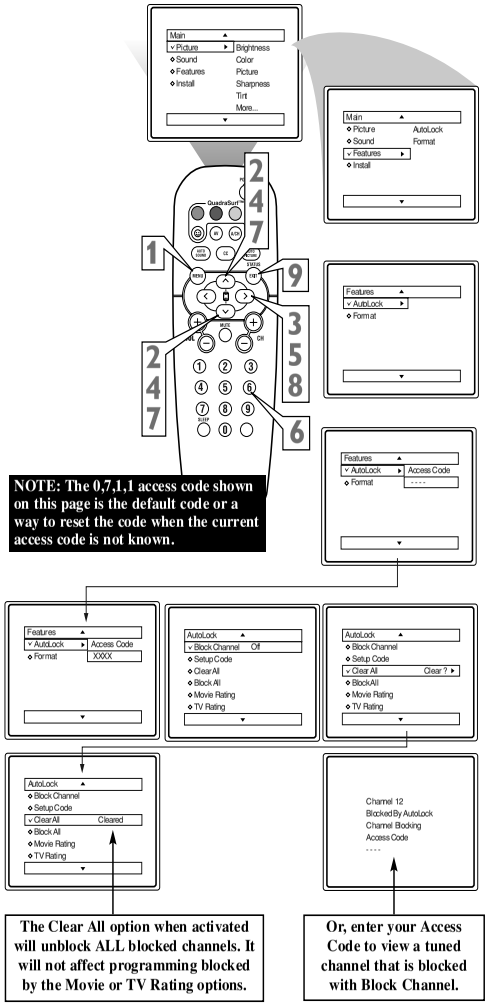
After blocking specific channels there may come a time when you want to clear all the channels so they can be viewed. The following steps explain how to CLEAR ALL blocked channels.

1. **Press the MENU button** on the remote to show the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ button** until the word **FEATURES** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the FEATURES menu options.
4. **Press the CURSOR UP ▲ or DOWN ▼ button** until the words AutoLock are highlighted.
5. **Press the CURSOR RIGHT ▶ button.**
6. **Enter the correct access code number. "XXXX"** shows on the Access Code display as you **press the NUMBERED buttons.** AutoLock menu options will be displayed.
7. **Press the CURSOR UP ▲ or DOWN ▼ buttons** until the words **CLEAR ALL** are highlighted.
8. **Press the CURSOR RIGHT ▶ button** to clear all blocked channels. The Clear All option will read, "Cleared."
9. **When finished, press the STATUS /EXIT button** to remove the menu from the TV's screen.

Helpful Hint

If you tune to a blocked channel and enter your Access Code to view the channel, ALL blocked channels will be viewable until the TV is powered OFF and then turned back ON. When the TV is powered back ON, the previously blocked channels will be blocked again.

CLEAR ALL will not work with the Movie and TV Ratings. These options must be reset individually.



NOTE: The 0,7,1,1 access code shown on this page is the default code or a way to reset the code when the current access code is not known.

The Clear All option when activated will unblock ALL blocked channels. It will not affect programming blocked by the Movie or TV Rating options.

Or, enter your Access Code to view a tuned channel that is blocked with Block Channel.

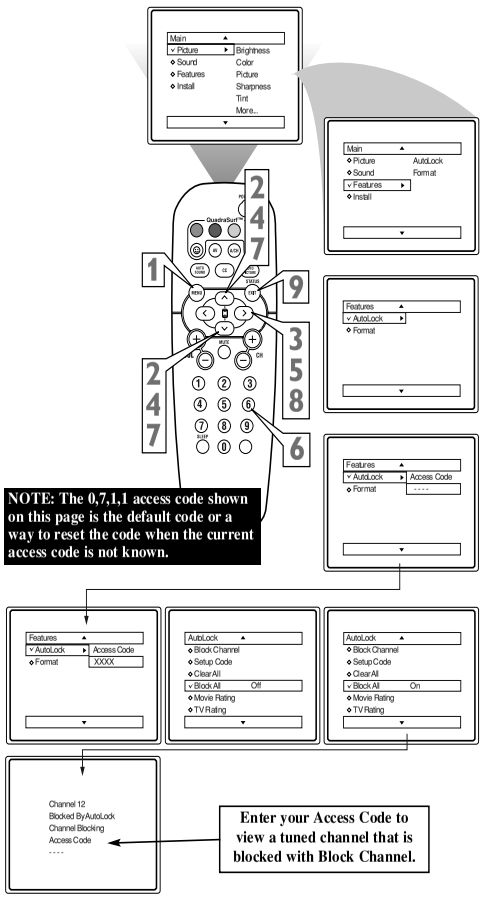
How to Block All Channels at the Same Time

There may come a time when you want to Block All the television's channels. Maybe you don't want your children to watch TV for a given time. With the Block All control, ALL available channels (including the A/V Inputs) can be set to block at the same time.

1. **Press the MENU button** on the remote to show the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ button** until the word **FEATURES** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the FEATURES menu options.
4. **Press the CURSOR UP ▲ or DOWN ▼ button** until the words AutoLock are highlighted.
5. **Press the CURSOR RIGHT ▶ button.**
6. **Enter the correct access code number. "XXXX"** shows on the Access Code display as you **press the NUMBERED buttons.** AutoLock menu options will be displayed.
7. **Press the CURSOR UP ▲ or DOWN ▼ buttons** until the words **BLOCK ALL** are highlighted.
8. **Press the CURSOR RIGHT ▶ button** to turn Block All ON or OFF. When ON is selected, ALL available channels will be blocked.
9. **When finished, press the STATUS/EXIT button** to remove the menu from the screen.

Helpful Hint

If you tune to a blocked channel and enter your Access Code to view the channel, ALL blocked channels will be viewable until the TV has been turned off. When the TV is powered back ON, the previously blocked channels will be blocked again.



NOTE: The 0,7,1,1 access code shown on this page is the default code or a way to reset the code when the current access code is not known.

Enter your Access Code to view a tuned channel that is blocked with Block Channel.

BLOCKING PROGRAMS BASED ON MOVIE RATINGS

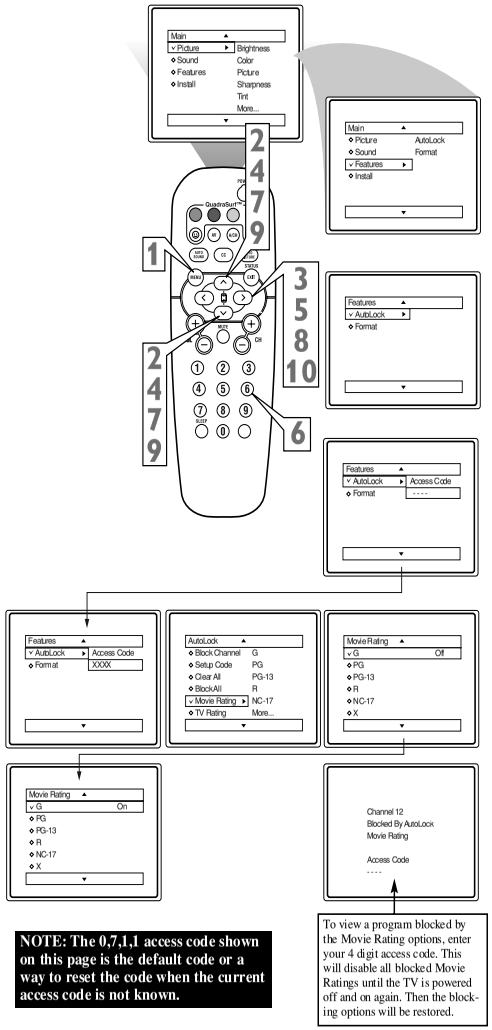
There are two types of program ratings within the AutoLock™ feature. One is based on the Movie Industry ratings while the other is based on the TV Industry ratings. Both can be used to block or censor programming that has been rated in either manner.

Let's first look at the Movie Rating options of AutoLock™:

1. **Press the MENU button** on the remote to display the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ button** until the word **FEATURES** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the FEATURES menu options.
4. **Press the CURSOR UP ▲ or DOWN ▼ button** until AutoLock is highlighted.
5. **Press the CURSOR RIGHT ▶ button.** The screen will prompt you for your Access Code.
6. **Using the NUMBERED buttons** on the remote, enter your 4 digit Access Code. The AutoLock menu options will be displayed.
7. **Press the CURSOR UP ▲ or DOWN ▼ button** to highlight the words MOVIE RATINGS.
8. **Press the CURSOR RIGHT ▶ button** to display the **MOVIE RATINGS** options (G, PG, PG-13, R, NC17, or X).
9. **Press the CURSOR UP ▲ or DOWN ▼ button** to highlight any of the Movie Ratings options. When highlighted, all these options can be turned **ON** *(which will allow blocking)* or **OFF** *(which will allow viewing).*
10. **Use the CURSOR RIGHT ▶ button** on the remote to turn the rating option ON or OFF.

HELPFUL HINT

When a rating is set to block, all higher ratings will be automatically blocked as well. (Example: If the the PG-13 rating is set to block, the R, NC-17, and X ratings will also be blocked.



NOTE: The 0,7,1,1 access code shown on this page is the default code or a way to reset the code when the current access code is not known.

To view a program blocked by the Movie Rating options, enter your 4 digit access code. This will disable all blocked Movie Ratings until the TV is powered off and on again. Then the blocking options will be restored.

BLOCKING PROGRAMS BASED ON TV RATINGS

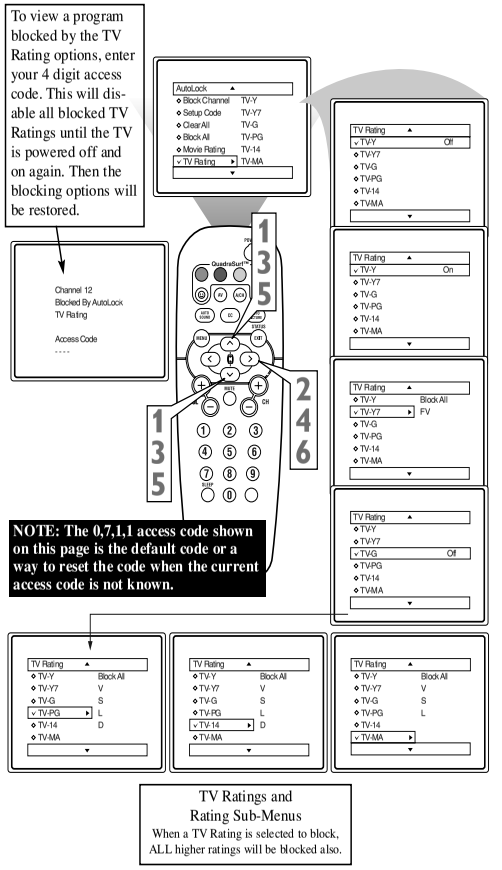
This portion of the AutoLock™ features cover program ratings based on the TV Industry rating system. This is known as TV Ratings within AutoLock™.

After selecting the Autolock™ feature and entering your personal access code, the AutoLock™ options screen appears;

1. **Scroll the menu using the CURSOR UP ▲ or DOWN ▼ buttons** until the words **TV RATINGS** are highlighted.
2. **Press the CURSOR RIGHT ▶ button** to display the **TV Ratings (TV-Y, TV-Y7, TV-G, TV-PG, TV-14, or TV-MA).** When highlighted, the TV-Y and TV-G can be turned **ON** *(which will allow blocking)* or **OFF** *(which will allow viewing),* of these rated programs.

   The ratings of TV-Y7, TV-PG, TV-14, TV-MA can be customized to block V (violence), FV (fantasy violence), S (sexual situations), L (coarse language), or D (suggestive dialogue).
3. **Press the CURSOR UP ▲ or DOWN ▼ button** to highlight the desired rating.
4. **Press the CURSOR RIGHT ▶ button** on the remote to turn the TV-Y or TV-G rating ON or OFF. **Or, press the CURSOR RIGHT ▶ button** to enter the sub-menus for the TV-Y7, TV-PG, TV-14 or TV-MA ratings.
5. If the TV-Y7, TV-PG, TV-14 or TV-MA sub-menu is accessed, **press the CURSOR UP ▲ or CURSOR DOWN ▼ button** to select one of the options (Block All, V, S, L, D, or FV).
6. **Press the CURSOR RIGHT ▶ button** on the remote to turn the option ON or OFF.

To view a program blocked by the TV Rating options, enter your 4 digit access code. This will disable all blocked TV Ratings until the TV is powered off and on again. Then the blocking options will be restored.



NOTE: The 0,7,1,1 access code shown on this page is the default code or a way to reset the code when the current access code is not known.

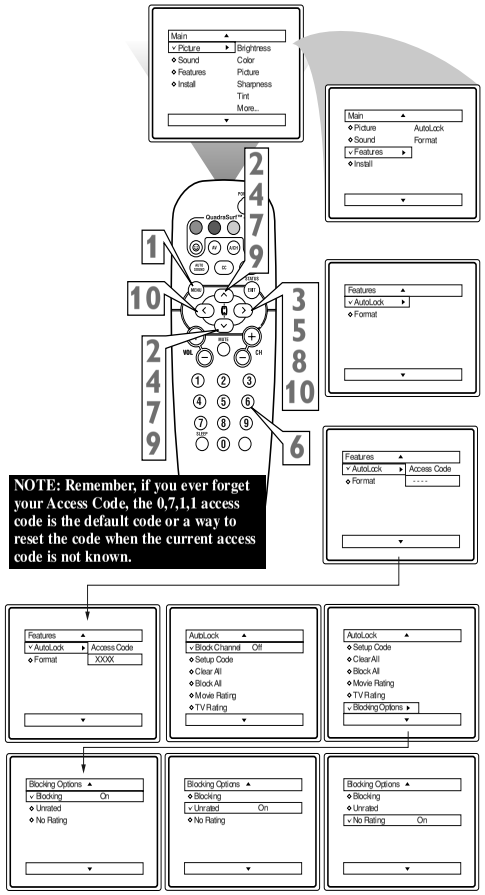
TV Ratings and Rating Sub-Menus
When a TV Rating is selected to block, ALL higher ratings will be blocked also.

TV-Y - (All children -- *This program is designed to be appropriate for all children.*) Designed for a very young audience, including children ages 2-6. This type of programming is not expected to frighten younger children.
TV-Y7 - (Directed to Older Children -- *This program is designed for children age 7 and above.*) It may be more appropriate for children who have acquired the development skills needed to distinguish between make-believe and reality. This programming may include mild fantasy and comic violence (FV).
TV-G - (General Audience -- *Most parents would find this program suitable for all ages.*) This type of programming contains little or no violence, no strong language and little or no sexual dialogue or situations.
TV-PG - (Parental Guidance Suggested -- *This program contains material that parents may find unsuitable for younger children.*)This type of programming contains one or more of the following: some suggestive dialogue (D), infrequent coarse language (L), some sexual situations (S), or moderate violence (V).
TV-14 - (Parents Strongly Cautioned -- *This program contains some material that many parents would find unsuitable for children under 14 years of age.*) This type of programming contains one or more of the following: intensely suggestive dialogue (D), strong coarse language (L), intense sexual situations (S), or intense violence (V).
TV-MA - (Mature Audience Only -- *This program is specifically designed to be viewed by adults and therefore may be unsuitable for children under 17.*) This type of programming contains one or more of the following: crude indecent language (L), explicit sexual situations (S), or graphic violence (V).

OTHER AUTOLOCK™ BLOCKING OPTIONS

AutoLock™ offers the viewer other blocking features as well. With these Blocking Options, the censoring can be turned ON or OFF.

1. **Press the MENU button** on the remote to show the on-screen menu.
2. **Press the CURSOR UP ▲ or DOWN ▼ button** until the word **FEATURES** is highlighted.
3. **Press the CURSOR RIGHT ▶ button** to display the FEATURES menu options.
4. **Press the CURSOR UP ▲ or DOWN ▼ button** until the words AutoLock are highlighted.
5. **Press the CURSOR RIGHT ▶ button.**
6. **Enter the correct access code number. "XXXX"** shows on the Access Code display as you **press the NUMBERED buttons.** AutoLock menu options will be displayed.
7. **Press the CURSOR UP ▲ or DOWN ▼ buttons** until the words **BLOCKING OPTIONS** are highlighted.
8. **Press the CURSOR RIGHT ▶ button** to display the **Blocking Options (BLOCKING, UNRATED, or NO RATING) menu.**
9. **Press the CURSOR UP ▲ or DOWN ▼ buttons to** highlight the desired feature.
10. When highlighted, each feature can be turned **ON** or **OFF using the CURSOR RIGHT ▶ or LEFT ◀ buttons** on the remote.



NOTE: Remember, if you ever forget your Access Code, the 0,7,1,1 access code is the default code or a way to reset the code when the current access code is not known.

BLOCKING OPTIONS:

BLOCKING: This is what might be called the "master switch" for AutoLock™. When in the ON position, ALL blocking/censoring will take place. When in the OFF position, ALL blocking is disabled.

UNRATED: ALL unrated programs based on the Movie Ratings or Parental (TV) Guidelines can be blocked if this feature is set to ON and the BLOCKING feature is set to OFF.

NO RATING: ALL programming with NO content advisory data can be blocked if this feature is set to ON and the BLOCKING feature is set to OFF.

SETTING THE SLEEPTIMER CONTROL

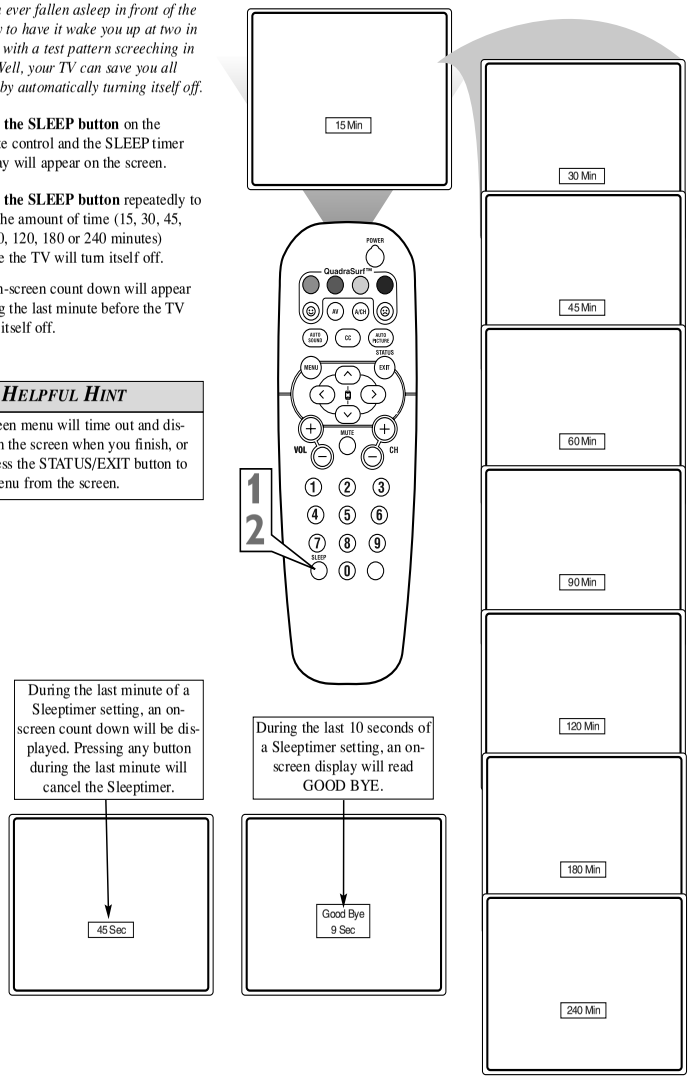
Have you ever fallen asleep in front of the TV only to have it wake you up at two in the morning with a test pattern screeching in your ears? Well, your TV can save you all that trouble by automatically turning itself off.

1. **Press the SLEEP button** on the remote control and the SLEEP timer display will appear on the screen.
2. **Press the SLEEP button** repeatedly to pick the amount of time (15, 30, 45, 60, 90, 120, 180 or 240 minutes) before the TV will turn itself off.

   An on-screen count down will appear during the last minute before the TV shuts itself off.

HELPFUL HINT

The on-screen menu will time out and disappear from the screen when you finish, or you can press the STATUS/EXIT button to clear the menu from the screen.



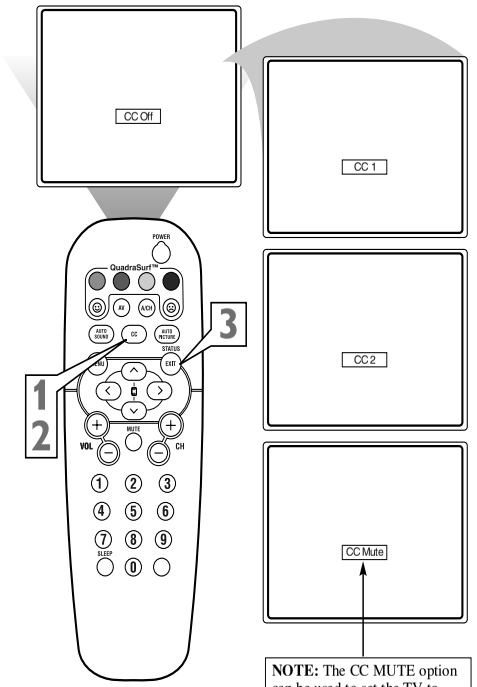
How to use the Closed Captioning Control

Closed Captioning (CC) allows you to read the voice content of television programs on the TV screen. Designed to help the hearing impaired, this feature uses on-screen "text boxes" to show dialogue and conversations while the TV program is in progress.

1. **Press the CC button** on the remote to display the current Closed Caption setting.
2. **Press the CC button repeatedly** to choose from the four Closed Caption options (CC Off, CC 1, CC 2, CC Mute). Dialogue (and descriptions) for the action on the captioned TV program will appear on-screen if the tuned program is broadcasting CC information.
3. **When finished, press the STATUS /EXIT button** to remove the menu from the TV's screen or let the option time out and disappear from the TV screen.

Helpful Hint

Not all TV programs and product commercials are made with Closed Caption (CC) information included. Neither are all Closed Caption modes (CC1, or CC2) necessarily being used during the transmission of a closed caption program. Refer to your area's TV program listings for the stations and times of Closed Caption shows.



NOTE: The CC MUTE option can be used to set the TV to turn the Closed Caption mode "ON" whenever the MUTE button on the remote is pressed. This activates the CC1 option.

Setting the AutoPicture™ Control

Whether you're watching a movie or a sporting event, your TV has automatic video control settings matched for your current program source or content. The AutoPicture™ feature quickly resets your TV's video controls for a number of different types of programs and viewing conditions you may have in your home. Each AutoPicture™ setting is preset at the factory to automatically adjust the TV's Brightness, Color, Picture, Sharpness, Tint, Color Temperature, DNR and Contrast+ levels.

1. **Press the AUTO PICTURE button** on the remote control. The current Auto Picture setting will appear in the middle of the screen.
2. **Press the AUTO PICTURE button repeatedly** to select either PERSONAL, MOVIES, SPORTS, WEAK SIGNAL, or MULTI MEDIA picture settings.

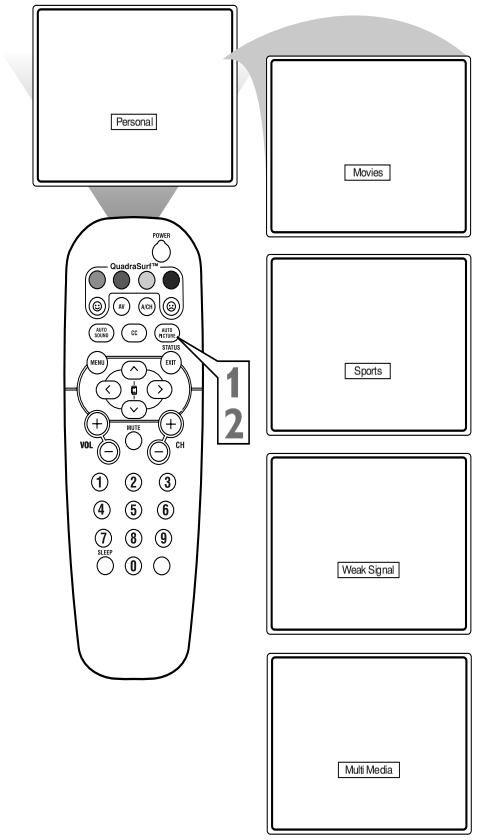
Note: The **PERSONAL** setting is the setting that you setup using the PICTURE options within the on-screen menu. This is the only Auto Picture setting that can be changed. All other settings are setup at the factory during the time of production.

MOVIES - Preset picture options for watching Video Tapes, or DVDs.

SPORTS - Preset picture options for watching sporting events.

WEAK SIGNAL - Preset picture options for watching programs where the reception is not at its best.

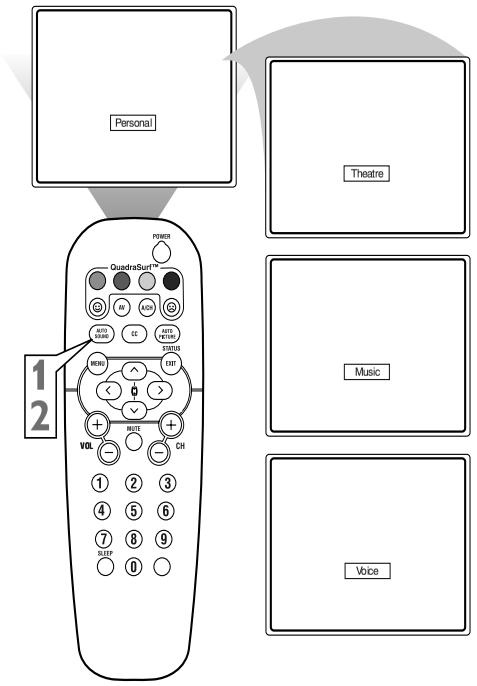
MULTI MEDIA - Preset picture options for use with video gaming.



SETTING THE AUTOSOUND™ CONTROL

The AutoSound™ feature allows the listener to select between four different factory set sound options. Personal (which can be set by the user), Theatre (for movie viewing), Music (for musical type programming) and Voice (when the program is mainly dialogue). These setting affect the Sound menu's Bass, Treble, AVL, and Incredible Surround controls

To select any of the options follow the directions below.



1 **Press the AUTO SOUND button** on the remote control. The current Auto Sound setting will appear in the middle of the screen.

2 **Press the AUTO SOUND button repeatedly** to toggle between the four settings.

Note: Only the **PERSONAL** control can be changed by the viewer. This changes the settings in the main on-screen menu's sound controls.

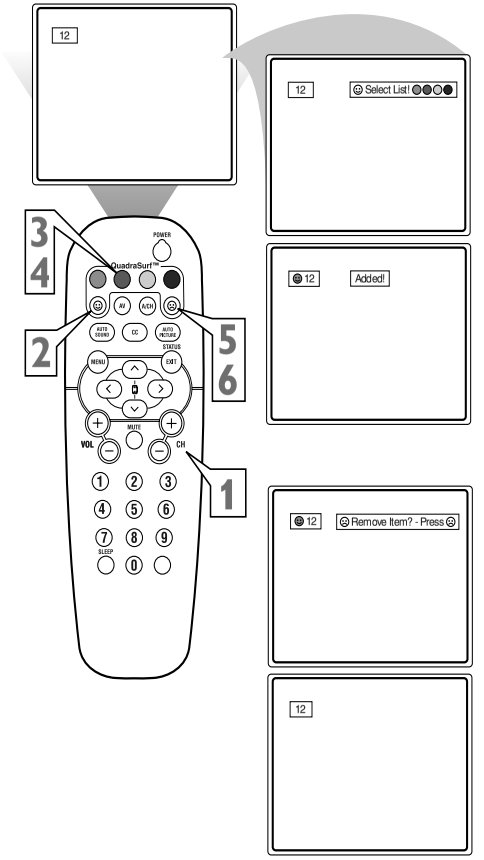
THEATRE - Preset sound options for watching movies.

MUSIC - Preset sound options for musical programming where there is little dialogue.

VOICE - Preset sound options for programming where heavy dialogue is present.

USING THE QUADRASURF™ BUTTONS

A "list" or series of previously viewed channels can be selected with the QuadraSurf™ (colored) buttons on your remote control. With this feature you can easily switch between different TV programs that currently interest you. The QuadraSurf™ control allows you set up four different personal Surf lists using the colored buttons (on the remote control), each holding up to ten channels in its quick viewing "list."



1 **Press the CHANNEL (+) or (–) buttons** (or the NUMBER buttons) to select a channel to add to one of the SURF lists.

2 **Press the SMILEY ☺ button** on the remote control to ADD the channel to one of the SURF lists.

3 **Press the corresponding COLORED (Red, Green, Yellow or Blue) button** to add the channel to that button's Surf list. (Up to ten channels per button can be stored.)

Repeat steps 1 through 3 to add additional channels (up to 10) to each of the the SURF lists.

To remove a channel from one of the SURF lists;

4 **Press the COLORED QuadraSurf™ button** until the desired channel appears. The screen will display the channel number with a colored "Smiley" face to indicate the Colored button it relates to.

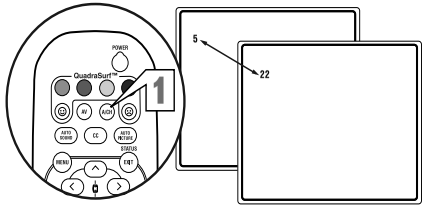
5 **While the "Smiley" face channel indicator is displayed, press the FROWNIE ☹ face button.** The screen will read, "Remove item? - Press ☹ ."

6 **Press the FROWNIE ☹ face button again** to confirm your decision to remove the channel from the Surf list.

Repeat steps 4-6 to remove other channels from Surf lists.

ALTERNATE CHANNEL

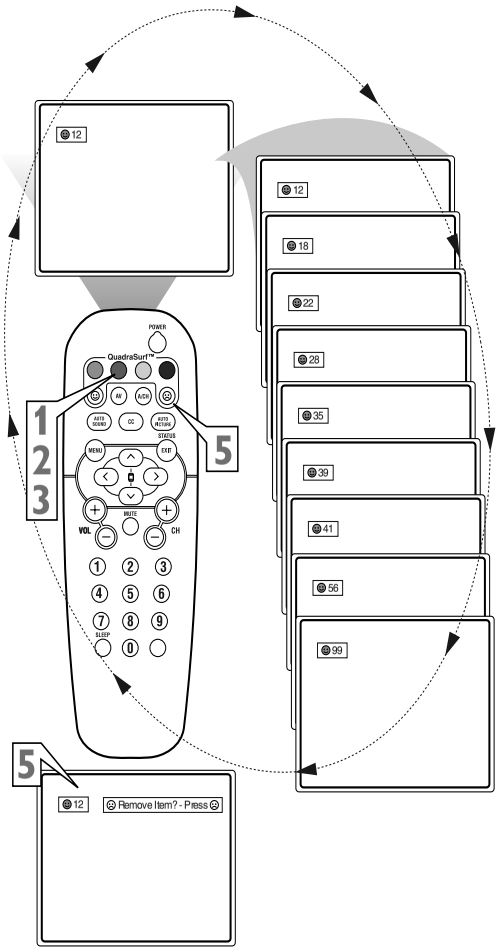
Your remote also has an A/CH (Alternate Channel) button. Pressing this button will toggle between the Current and one previously selected channel.



USING THE QUADRASURF™ BUTTONS

The QuadraSurf™ buttons on your remote control allow you to store up to 10 channels per button (40 total). This is a great feature if you want to store all your favorite Sports channels, Movie channels, or News channels in one surf list. Family members can have there own favorite list of channels. You can even program the external A/V Input jacks (Front channel) for one of the buttons making it a "source" button for your external accessory devices.

Assuming channels have now been added to the four QuadraSurf™ lists (the four colored buttons on the remote, see the previous page), let's review how the feature works.



1 **Press one of the pre-programmed COLORED buttons** on the remote (Red, Green, Yellow or Blue). The screen will display a smiley face with the first programmed channel for that surf list.

2 **While the colored "smiley" face still appears on the screen, press the same COLORED button** on the remote to tune the second channel programmed for that specific surf list.

3 **Repeatedly pressing the same COLORED button** while the "smiley" face appears will tune all the programmed channels for that specific surf list. After the last channel is tuned, pressing the COLORED button again will return you to the first channel in the list.

If the "smiley" face disappears from the screen and the same COLORED button is pressed, the surf channels will be displayed starting with the FIRST programmed channel again.

4 Repeat steps 1-3 for the other three COLORED buttons (Surf lists) if desired.

5 Any time the "smiley" face appears with the channel number, **pressing the "frownie" face button** will allow you to remove it from the list (see the previous page for more details).

Personal Notes:

4. Mechanical Instructions

Index of this chapter:

4.1 Rear Cover Removal

1. Remove all fixation screws of the rear cover.
2. Now pull the rear cover in backward direction to remove it.

4.2 Service Position Main Panel

1. Disconnect the strain relief of the AC power cord.
2. Remove the main panel, by pushing the two center clips outward [1]. At the same time pull the panel away from the CRT [2].
3. If necessary disconnect the degaussing coil by removing the cable from (red) connector 0212.
4. Move the panel somewhat to the left and flip it 90 degrees [3], with the components towards the CRT.

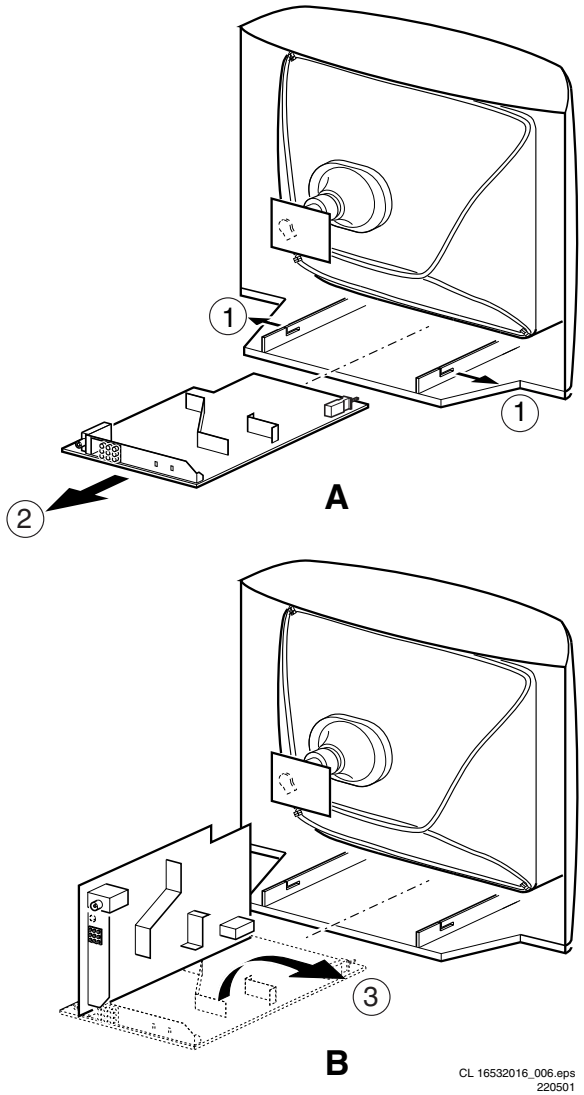


Figure 4-1 Service Position

4.3 Rear Cover Mounting

Before you mount the rear cover, perform the following checks:

1. Check whether the mains cord is mounted correctly in its guiding brackets.
2. Re-place the strain relief of the AC power cord into the cabinet.
3. Check whether all cables are replaced in their original position

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points

This chassis is equipped with test points in the service printing. In the schematics test points are identified with a rectangle box around Fxxx or Ixxx. On the PCB, test points are specifically mentioned in the service manual as “half moons” with a dot in the center.

Table 5-1 Test Point Overview

TEST POINT	CIRCUIT	DIAGRAM
Fxxx, Ixxx	POWER SUPPLY	A1
Fxxx, Ixxx	Deflection	A2
Fxxx, Ixxx	TUNER & IF	A3
Fxxx, Ixxx	VIDEO PROCESSING	A4
Fxxx, Ixxx	AUDIO PROCESSING	A5
Fxxx, Ixxx	AUDIO AMPLIFIER + MONO SOUND PROCESSING	A6
Fxxx, Ixxx	FRONT IO + FRONT CONTROL + HEAD-PHONE	A7
Fxxx, Ixxx	DVD POWER SUPPLY	A9
Fxxx, Ixxx	CRT PANEL	B1

Perform measurements under the following conditions:
- Service Default Alignment Mode.
- Video: color bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

Service Default Alignment Mode (SDAM) offers several features for the service technician.

.

There is also the option of using ComPair, a hardware interface between a computer (see requirements) and the TV chassis. It offers the ability of structured trouble shooting, error code reading and software version readout for all chassis. Requirements: To run ComPair on a computer (laptop or desktop) requires, as a minimum, a 486 processor, Windows 3.1 and a CD-ROM drive. A Pentium Processor and Windows 95/98 are however preferred (see also paragraph 5.4).

Table 5-2 SW Cluster

SW Cluster	Software mane	UOC type	UOC Diversity	Special Features
L3SUS1	L03US1 x.y	TDA9377	55K ROM Size	Stereo
L3SUS2	L03US2 x.y	TDA9377	55K ROM Size	Magnavox Stereo
Abbreviations in Software name: U = Nafta, S = Stereo.				

5.2.1 Service Default Alignment Mode (SDAM)

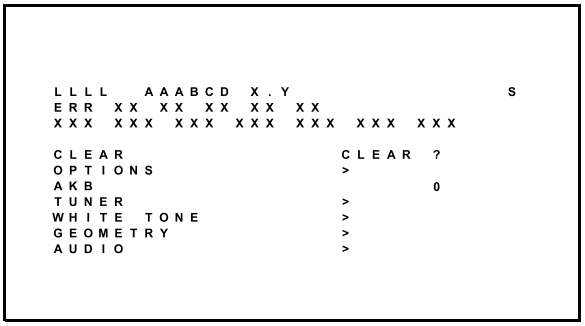
Purpose
- To change option settings.
- To create a predefined setting to get the same measurement results as given in this manual.
- To display / clear the error code buffer.
- To override SW protections.
- To perform alignments.
- To start the blinking LED procedure.

Specifications
- Tuning frequency: 61.25 MHz (channel 3) for NTSC-sets (Nafta).
- Color system: NTSC-M.
- All picture settings at 50 % (brightness, color contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled, like:
  - (Sleep) timer,
  - Child/parental lock,
  - Blue mute,
  - Hotel/hospitality mode
  - Auto switch-off (when no “IDENT” video signal is received for 15 minutes),
  - Skip / blank of non-favorite presets / channels,
  - Auto store of personal presets,
  - Auto user menu time-out.
- Operation hours counter.
- Software version.
- Option settings.
- Error buffer reading and erasing.
- Software alignments.

How to enter SDAM

Use one of the following methods:
- Use a standard customer RC-transmitter and key in the code 062596 directly followed by the “M” (menu) button or
- Short jumper wires 9257 and pin 4 of 7200 on the mono carrier (see Fig. 8-1) and apply AC power. Then press the power button (remove the short after start-up).
- Caution: Entering SDAM by shorten wires 9257 and pin 4 of 7200 will override the +8V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could lead to damaging the set.
- Or via ComPair.

After entering SDAM, the following screen is visible, with S at the upper right side for recognition.



CL 36532044_033.eps
130603

Figure 5-1 SDAM Menu

- **LLLL.** This is the operation hours counter. It counts the normal operation hours, not the standby hours.

- **AAABCD-X.Y.** This is the software identification of the main micro controller:
  - A = the project name (L03).
  - B = the region: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM.
  - C = the feature of software diversity: N = stereo non-DBX, S = stereo dBx, M = mono, D = DVD
  - D = the language cluster number:
  - X = the main software version number.
  - Y = the sub software version number.
- **S.** Indication of the actual mode. S= SDAM= Service Default Alignment mode.
- **Error buffers.** Five errors possible.
- **Option bytes.** Seven codes possible.
- **Clear.** Erase the contents of the error buffer. Select the CLEAR menu item and press the CURSOR RIGHT key. The content of the error buffer is cleared.
- **Options.** To set the Option Bytes. See chapter 8.3.1 for a detailed description.
- **AKB.** Disable (0) or enable (1) the “black current loop” (AKB = Auto Kine Bias).
- **Tuner.** To align the Tuner. See chapter 8.3.2 for a detailed description.
- **White Tone.** To align the White Tone. See chapter 8.3.3 for a detailed description.
- **Geometry.** To align the set geometry. See chapter 8.3.4 for a detailed description.
- **Audio. Use default value (Stereo set only),** align when necessary. See chapter 8.3.x for a detailed description.
  <<<<<<<

How to navigate

- In SDAM, select menu items with the CURSOR UP/DOWN key on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the CURSOR UP/DOWN key to display the next / previous menu items.
- With the CURSOR LEFT/RIGHT keys, it is possible to:
  - Activate the selected menu item.
  - Change the value of the selected menu item.
  - Activate the selected submenu.
- When you press the MENU button twice, the set will switch to the normal user menus (with the SDAM mode still active in the background). To return to the SDAM menu press the OSD / STATUS button.
- When you press the MENU key in a submenu, you will return to the previous menu.

How to store settings

To store settings, leave the SDAM mode with the Standby button on the remote.

How to exit

Switch the set to STANDBY by pressing the power button on the remote control (if you switch the set 'off' by removing the AC power, the set will return in SDAM when AC power is re-applied). The error buffer is **not** cleared.

5.3 Problems and Solving Tips

5.3.1 Picture Problems

Note: Below described problems are all related to the TV settings. The procedures to change the value (or status) of the different settings are described.

No colors / noise in picture

1. Press the MENU button on the remote control.
2. Select the INSTALLATION sub menu.
3. Select and change the SYSTEM setting until picture and sound are correct.
4. Select the STORE menu item.

Colors not correct / unstable picture

1. Press the MENU button on the remote control.
2. Select the INSTALLATION sub menu.
3. Select and change the SYSTEM setting until picture and sound are correct.
4. Select the STORE menu item.

Picture too dark or too bright

Increase / decrease the BRIGHTNESS and / or the CONTRAST value when:

- The picture improves after you have pressed the “Smart Picture” button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new “Personal” preference value is automatically stored.

White line around picture elements and text

Decrease the SHARPNESS value when:

- The picture improves after you have pressed the “Smart Picture” button on the remote control.

The new “Personal” preference value is automatically stored.

Snowy picture

- No or bad antenna signal. Connect a proper antenna signal.
- Antenna not connected. Connect the antenna.
- No channel / pre-set is stored at this program number. Go to the INSTALL menu and store a proper channel at this program number.
- The tuner is faulty (in this case the CODES line will contain error number 10). Check the tuner and replace / repair if necessary.

Snowy picture and/or unstable picture

- A scrambled or decoded signal is received.

Black and white picture

Increase the COLOR value when:

- The picture improves after you have pressed the “Smart Picture” button on the remote control.

The new “Personal” preference value is automatically stored.

Menu text not sharp enough

Decrease the CONTRAST value when:
The picture improves after you have pressed the “Smart Picture” button on the remote control.
The new “Personal” preference value is automatically stored.

5.3.2 Sound Problems

No sound or sound too loud (after channel change / switching on)

Increase / decrease the VOLUME level.
Press the Smart Sound button repeatedly to access 4 different types of sound settings and choose your desired setting.

5.4 Service Tools

5.4.1 ComPair

Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (service remote control), which allows faster and more accurate diagnostics. ComPair has three big advantages:

1. ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
2. ComPair allows very detailed diagnostics (on I^2C level) and is therefore capable of accurately indicating problem areas.

You do not have to know anything about I²C commands yourself because ComPair takes care of this.

3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the Force/SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

Specifications

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial (or RS-232) cable.
For this chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector(s).

The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:

- Automatically (by communicating with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I²C/UART level. ComPair can access the I²C/UART bus of the television. ComPair can send and receive I²C/UART commands to the microcontroller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I²C/UART buses of the TV-set.
- Manually (by asking questions to you): Automatic diagnosis is only possible if the microcontroller of the television is working correctly and only to a certain extent. When this is not the case, ComPair will guide you through the fault finding tree by asking you questions *(e.g. Does the screen give a picture? Click on the correct answer: YES / NO)* and showing you examples *(e.g. Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope)*. You can answer by clicking on a link *(e.g. text or a waveform picture)* that will bring you to the next step in the fault finding process.

By a combination of automatic diagnostics and an interactive question / answer procedure, ComPair will enable you to find most problems in a fast and effective way.

How to Connect

This is described in the chassis fault finding database in ComPair.

Caution: It is compulsory to connect the TV to the PC as shown in the picture below (with the ComPair interface in between), as the ComPair interface acts as a level shifter. If one connects the TV directly to the PC (via UART), ICs will be blown!

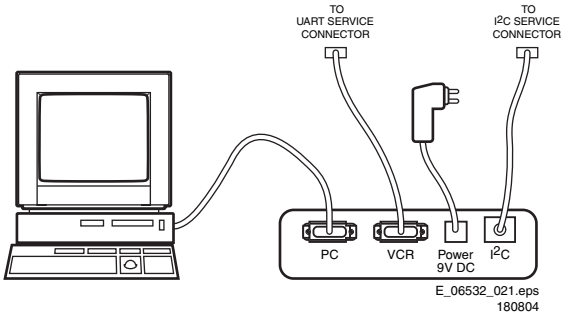


Figure 5-2 ComPair interface connection

How to Order

ComPair order codes (US):

- ComPair Software: ST4191.
- ComPair Interface Box: 4822 727 21631.
- AC Adapter: T405-ND.
- ComPair Quick Start Guide: ST4190.
- ComPair interface extension cable: 3139 131 03791.
- ComPair UART interface cable: 3122 785 90630.

Note: If you encounter any problems, contact your local support desk.

5.4.2 LVDS Tool

Introduction

This service tool (also called “ComPair Assistant 1“) may help you to identify, in case the TV does not show any picture, whether the Small Signal Board (SSB) **or** the display of a Flat TV is defective.
Furthermore it is possible to program EPLDs with this tool (Byte blaster). Read the user manual for an explanation of this feature.

Since 2004, the LVDS output connectors in our Flat TV models are standardised (with some exceptions). With the two delivered LVDS interface cables (31p and 20p) you can cover most chassis (in special cases, an extra cable will be offered).

When operating, the tool will show a small (scaled) picture on a VGA monitor. Due to a limited memory capacity, it is not possible to increase the size when processing high-resolution LVDS signals (> 1280x960). Below this resolution, or when a DVI monitor is used, the displayed picture will be full size.

Generally this tool is intended to determine if the SSB is working or not. Thus to determine if LVDS, RGB, and sync signals are okay.

How to Connect

Connections are explained in the user manual, which is packed with the tool.

Note: To use the LVDS tool, you must have ComPair release 2004-1 (or later) on your PC (engine version >= 2.2.05).
For every TV type number and screen size, one must choose the proper settings via ComPair. The ComPair file will be updated regularly with new introduced chassis information.

How to Order

- LVDS tool (incl. two LVDS cables: 31p and 20p): 3122 785 90671.
- LVDS tool Service Manual: 3122 785 00810.
- LVDS cable 30p (for LC4.3): 3122 785 90820 (available soon).
- LVDS cable 41p -> 31p for HD PDPs (dual -> single LVDS): 3122 785 90830 (available soon).

5.5 The Blinking LED Procedure

Via this procedure, you can make the contents of the error buffer visible via the front LED. This is especially useful when there is no picture.

When the SDAM is entered, the LED will blink the contents of the error-buffer.

- n short blinks (n = 1 - 14),
- When all the error-codes are displayed, the sequence finishes with a LED blink of 3 s,
- The sequence starts again.

.

Example of error buffer: 12 9 6 0 0
After entering SDAM:

- 12 short blinks followed by a pause of 3 s,
- 9 short blinks followed by a pause of 3 s,

- 6 short blinks followed by a pause of 3 s,
- 1 long blink of 3 s to finish the sequence,
- the sequence starts again.

5.6 Protections

If a fault situation is detected an error code will be generated and if necessary the set will be put in the protection mode. Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases, the microprocessor does not put the set in the protection mode. The error codes of the error buffer can be read via the service menu (SDAM), the blinking LED procedure or via ComPair.

To get a quick diagnosis the chassis has one service modes implemented:

- The Service Default Alignment Mode (SDAM). Start-up of the set in a predefined way and adjustment of the set via a menu and with the help of test patterns.

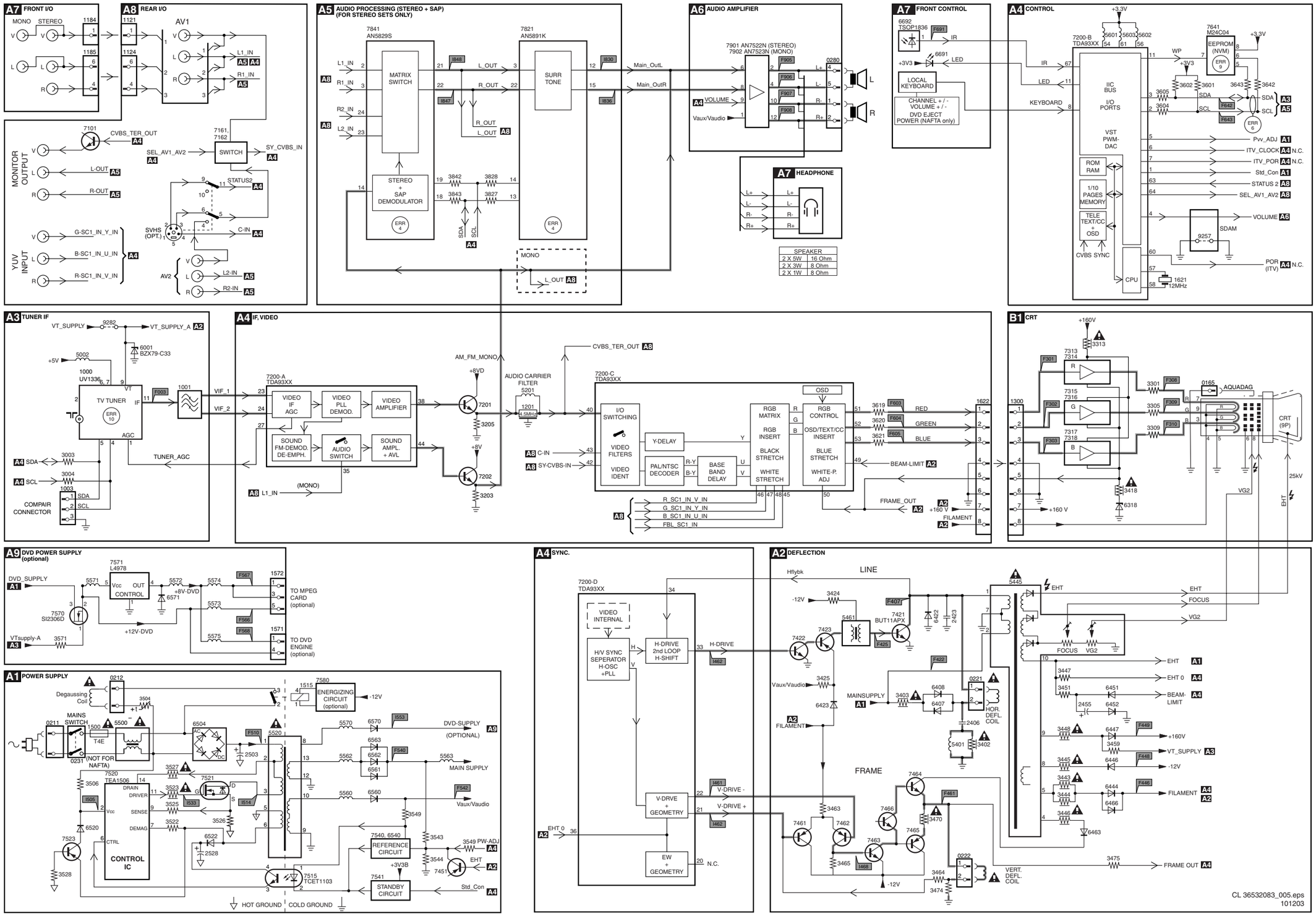
5.7 Repair Tips

Below some failure symptoms are given, followed by a repair tip.

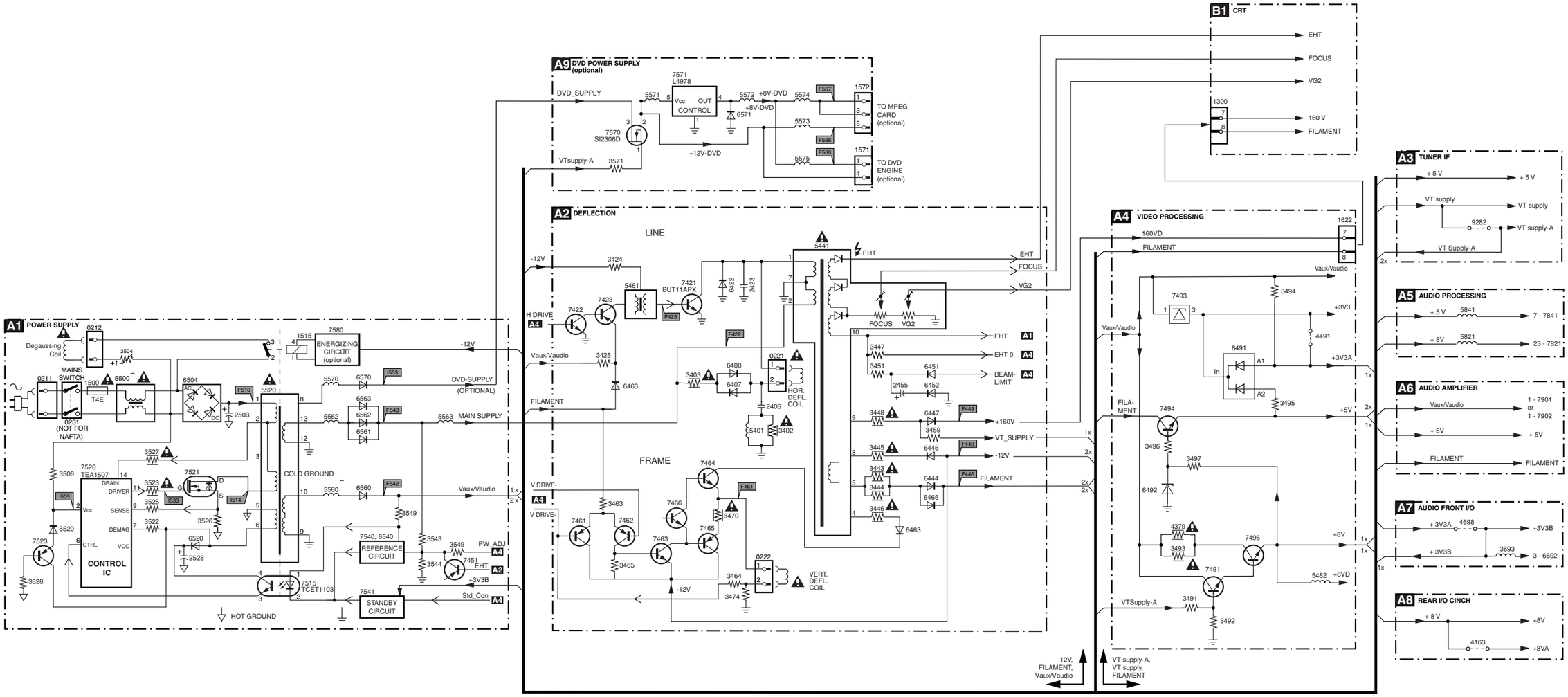
- **Set is dead and makes hiccupping sound.** "Main Supply" is available. Hiccupping stops when de-soldering L5563, meaning that problem is in the "Main Supply" line. No output voltages at LOT, no horizontal deflection. Reason: line transistor 7421 is defective.
- **Set is dead, and makes no sound.** Check power supply IC 7520. Result: voltage at pins 2, 6, 7, 9 and 11 are about 180 V and pin 14 is 0 V. The reason why the voltage on these pins is so high is because the output driver (pin 11) has an open load. That is why MOSFET 7521 is not able to switch. Reason: feedback resistor 3523 is defective. **Caution:** be careful measuring on the gate of 7521; circuitry is very high ohmic and can easily be damaged!
- **Set is in hiccup mode and shuts down after 8 s.** Blinking LED (set in SDM mode) indicates error 5. As it is unlikely that the "POR" and "+8V protection" happen at the same time, measure the "+8V". If this voltage is missing, check transistor 7491 & 7496.
- **Set is non-stop in hiccup mode.** Set is in over current mode; check the secondary sensing (opto coupler 7515) and the "Main Supply" voltage. Signal "Stdby_con" must be logic low under normal operation conditions and goes to high (3.3 V) under standby and fault conditions.
- **Set turns on, but without picture and sound.** The screen shows snow, but OSD and other menus are okay. Blinking LED procedure indicates error 11, so problem is expected in the tuner (pos. 1000). Check presence of supply voltages. As "Vlotaux+5V" at pin 5 and 7 are okay, "VT_supply" at pin 9 is missing. Conclusion: resistor 3449 & 3450 are defective

6. Block Diagrams, Testpoint Overviews, and Waveforms

Block Diagram



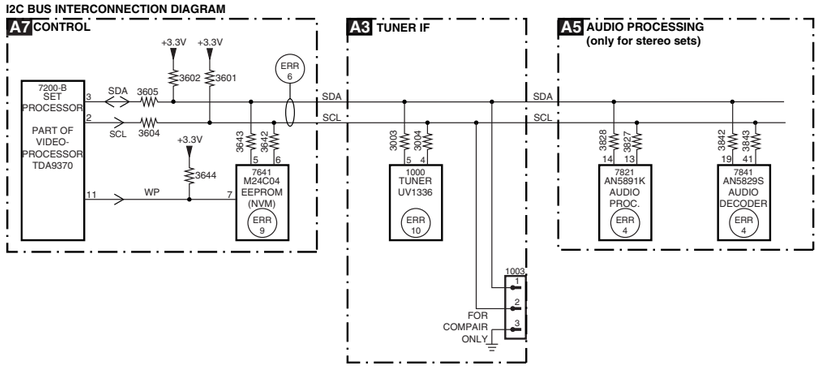
I²C and Supply Voltage Overview



ERROR CODE LIST

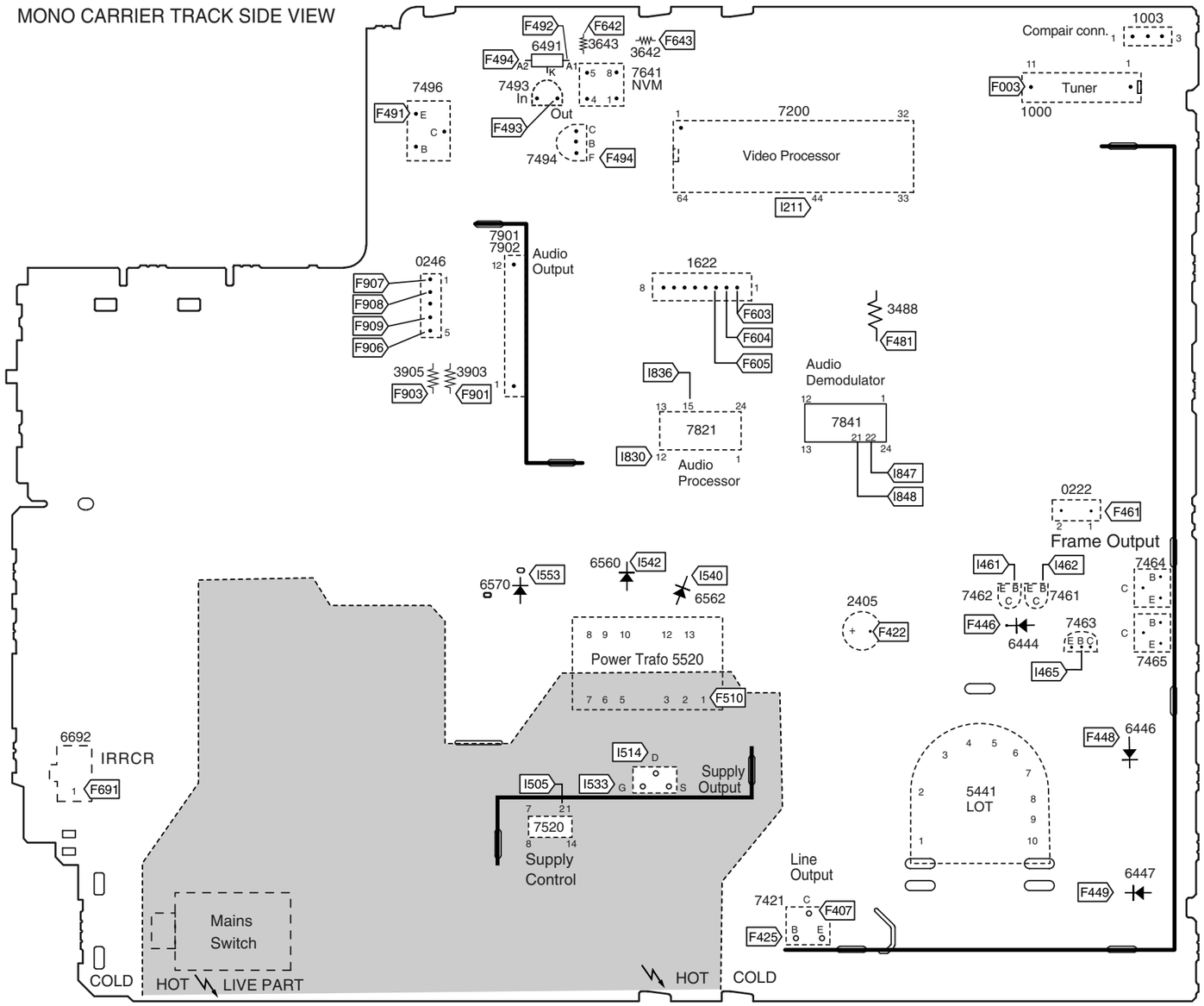
Error	Device	Error description	Check item	Diagram
0	Not applicable	No Error	-	-
1	Not applicable	X-Ray Protection (USA)	-	-
2	Not applicable	Horizontal Protection	7421, 7422, 7423	A2
3	Not applicable	Vertical Protection	7461, 7462, 7463, 7464, 7465, 7466	A2
4	AN5891K & AN5829S	Tone control & Audio processor I2C identification error	7821 (tone IC), 7841 (Stereo/Sap)	A5
5	TDA93XX	POR 3.3V / 8V Protection	7200, 7541, 7491, 7493, 7496	A4, A1
6	I2C bus	General I2C bus error	7200, 3604, 3605	A4
7	Not applicable	-	-	-
8	Not applicable	E/W Protection (Large Screen)	-	-
9	M24C16	NVM I2C identification error	7641, 3641, 3642, 3643	A4
10	Tuner	Tuner I2C identification error	1000, 3003, 3004	A3
11	Not applicable	Black current loop protection	3313, 7307, 7308, 7309, 7310, 7311, 7312, 7313, 7314, 7315, 7316, 7317, 7318, CRT	B1
12	Not applicable	MAP I2C identification error (USA)	-	-
13	Not applicable	VC I2C identification error (Eu)	-	-
14	Not applicable	DVD I2C identification error	-	-

I2C BUS INTERCONNECTION DIAGRAM

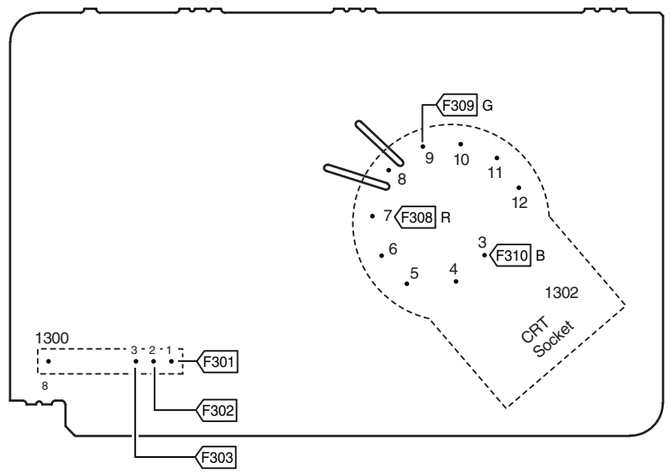


Testpoint Overview Mono Carrier and CRT Panel

MONO CARRIER TRACK SIDE VIEW



CRT TRACK SIDE VIEW



F605
1V / div DC
20µs / div.

F642
0.5V / div DC
20µs / div.

F643
0,5V / div DC
20µs / div.

F691
1V / div AC
2ms / div.

F901
0.5V / div AC
1ms / div.

F903
0.5V / div AC
1ms / div.

F905
0,5V / div AC
1ms / div.

F906
0,5V / div AC
1ms / div.

F907
0.5V / div AC
1ms / div.

F908
0.5V / div AC
1ms / div.

I211
1V / div DC
1ms / div.

I461
0.5V / div DC
5ms / div.

I462
0.5V / div DC
5ms / div.

I465
1V / div AC
5ms / div.

I505 =17V8 DC

F003
200mV / div AC
20µs / div.

F301
1V / div DC
20µs / div.

F302
1V / div DC
20µs / div.

F303
1V / div DC
20µs / div.

F308
50V / div DC
20µs / div.

F309
50V / div DC
20µs / div.

F310
50V / div DC
20µs / div.

F407
100V / div DC
20µs/div.

F425
5V / div AC
20µs / div.

F446
2V / div DC
20µs / div.

F448
10V / div DC
20µs / div.

F449
50V / div DC
20µs / div.

F461
20V / div DC
5ms / div.

F481
0,5V / div DC
20µs / div.

F491
2V / div DC
20µs / div.

F492
2V / div DC
20µms / div.

F493
2V / div DC
20µs / div.

F494
2V / div DC
20µs / div.

F510
50V / div DC
5µs / div.

F422 97V DC
F540 97V DC
F542 13V5 DC

F603
1V / div DC
20µs / div.

F604
1V / div DC
20µs / div.

I514
100V / div DC
5µs / div.

I533
2V / div DC
5µs / div.

I830
1V / div DC
1ms / div.

I836
1V / div DC
1ms / div.

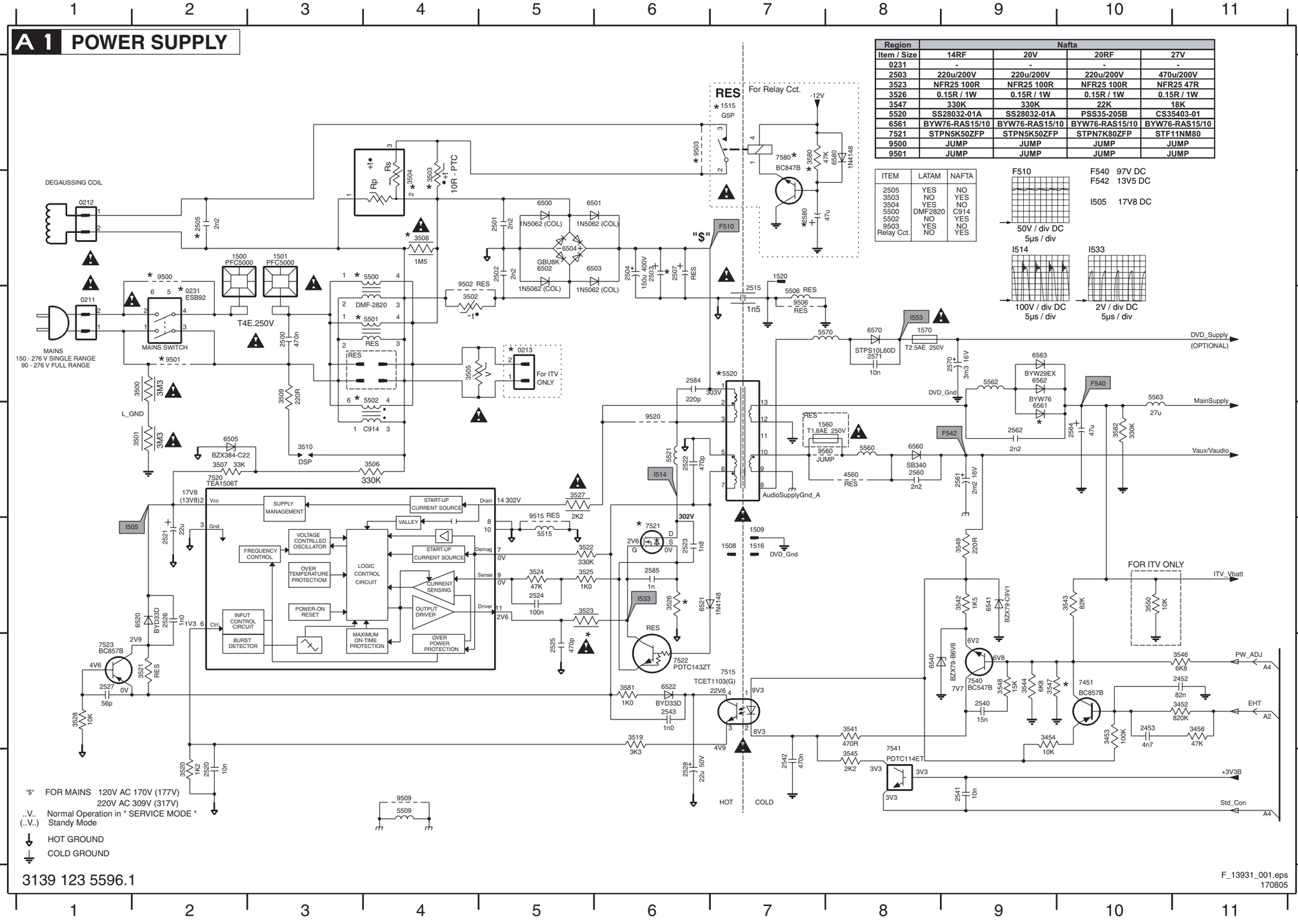
I847
0.5V / div DC
1ms / div.

I848
0.5V / div DC
1ms / div.

CL 36532044_031.eps
200603

7. Circuit Diagrams and PWB Layouts

Mono Carrier: Power Supply



Region	Nafta			
Item / Size	14RF	20V	20RF	27V
0231	-	-	-	-
2503	220u/200V	220u/200V	220u/200V	470u/200V
3523	NFR25 100R	NFR25 100R	NFR25 100R	NFR25 47R
3526	0.15R / 1W	0.15R / 1W	0.15R / 1W	0.15R / 1W
3547	330K	330K	22K	18K
5520	SS28032-01A	SS28032-01A	PSS35-205B	CS35403-01
6561	BYW76-RAS15/10	BYW76-RAS15/10	BYW76-RAS15/10	BYW76-RAS15/10
7521	STPN5K50ZFP	STPN5K50ZFP	STPN7K80ZFP	STF11NM80
9500	JUMP	JUMP	JUMP	JUMP
9501	JUMP	JUMP	JUMP	JUMP

ITEM	LATAM	NAFTA
2505	YES	NO
3503	NO	YES
3504	YES	NO
5500	DMF2820	C914
5502	NO	YES
9503	YES	NO
Relay Cct.	NO	YES

F510 50V / div DC 5µs / div
F540 97V DC
F542 13V5 DC
I505 17V8 DC
I514 100V / div DC 5µs / div
I533 2V / div DC 5µs / div

Mono Carrier: Deflection

A2 DEFLECTION

Line Deflection

Region	Nafta			
Item / Size	14RF	20V	20RF	27V
2406	-	-	270N / 250v	360N / 250V
2408	560n / 250V	560n / 250V	-	-
2423	15n / 1K6V	15n / 1K6V	9n1 / 1K6V	12n / 1K6V
2424	1n / 2KV	1n / 2KV	-	1n / 2KV
2441	33n / 50V	33n / 50V	15n / 50V	15n / 50V
2452	100n / 25V	100n / 25V	22n / 25V	22n / 25V
2453	-	-	-	2n2 / 50V
2457	470p / 500V	470p / 500V	470p / 500V	500V 470P
3402	2K2	2K2	2K2	NFR25H 2K2
3441	47K	47K	27K	22K
3442	100K	100K	100K	100K
3447	150K	150K	47K	47K
3451	8K2	8K2	-	8K2
3455	2K2	2K2	680R	2K2
3456	-	-	-	-
3460	47K	47K	100K	100K
3646	1M	1M	1M	1M
5401	-	-	-	-
5402	33u	33u	82u	59u [CL12514-00]
5441	JF050-119276R	JF050-119276R	JF050-119272R	JF0501-21123

Frame Deflection

3139 123 5596.1

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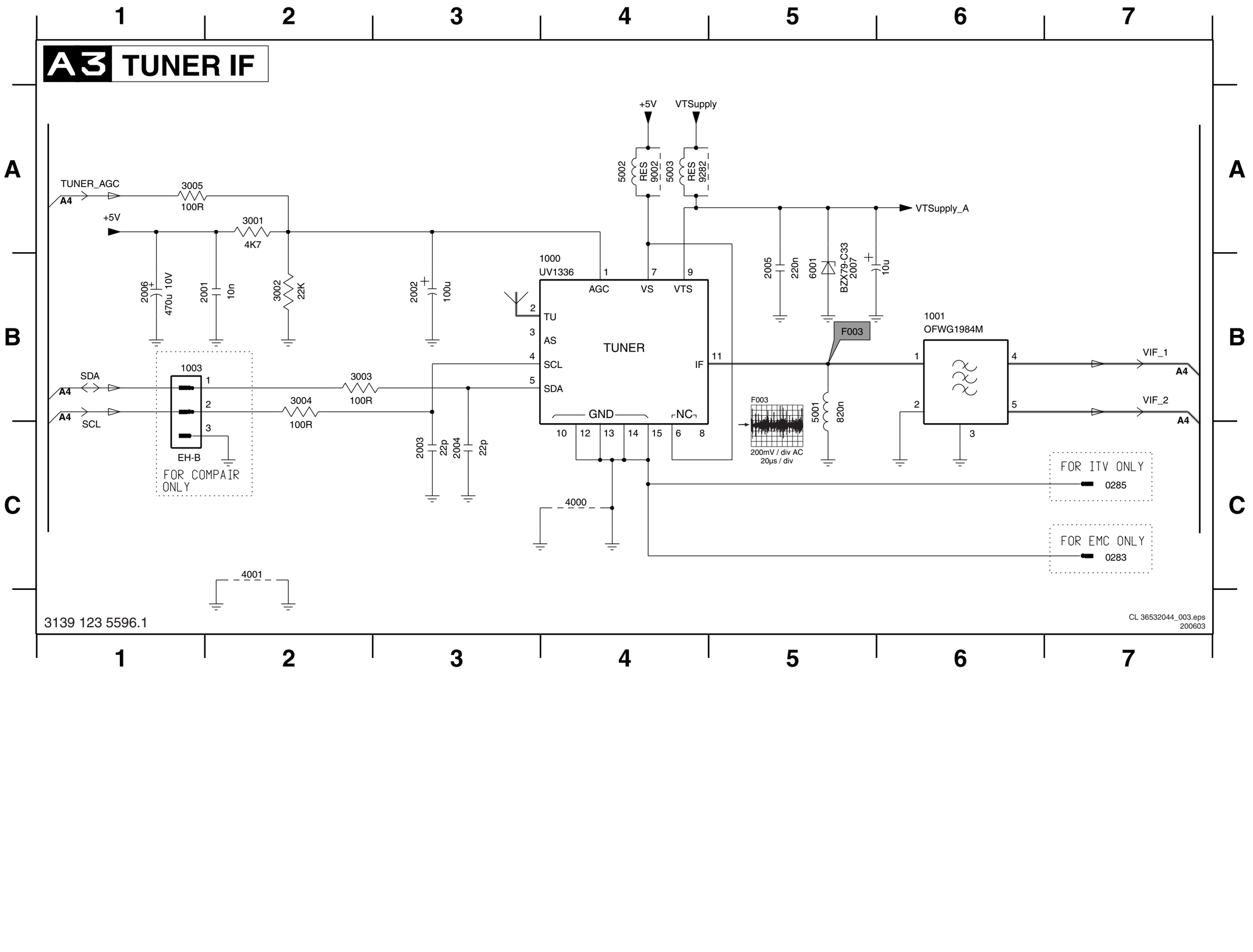
170805

0221 B4 6452 C8
0222 F6 6453 C8
1462 F6 6460 E3
1463 E7 6461 E5
2405 D3 6462 E5
2406 D4 6463 E5
2407 C4 6464 E3
2408 D4 7421 A3
2420 B2 7422 B2
2421 B2 7423 C2
2423 A4 7440 C8
2424 A4 7461 F2
2426 B1 7462 F2
2427 B1 7463 F3
2428 C1 7464 E4
2429 B1 7465 F4
2441 C9 7466 F3
2444 D8 9402 D4
2446 D8 9407 C4
2447 D7 9445 B6
2455 C8 9446 E6
2457 D7 9448 D6
2460 E5 9505 F8
2461 E1
2462 E3
2463 E3
2464 F3
2465 E5
2470 F5
2471 B1
2472 G4
2473 C7
3402 D4
3403 D3
3422 A3
3424 A1
3425 C1
3426 B3
3428 B2
3430 C2
3432 C2
3439 C8
3440 C8
3441 C7
3442 C7
3443 C6
3444 D6
3445 B6
3446 D6
3447 B8
3448 D6
3449 B8
3450 B8
3451 C8
3455 C9
3459 C7
3460 C9
3461 F1
3462 F1
3463 E2
3464 G2
3465 F2
3466 F2
3468 E3
3469 E4
3470 F4
3471 F4
3472 F4
3473 G5
3474 G5
3475 F5
3476 F5
3477 G4
3478 F5
4405 D3
5401 D4
5402 D4
5421 B3
5441 A5
5505 F8
6407 D4
6408 D4
6421 A4
6422 A3
6423 C1
6426 B2
6444 D7
6445 C7
6446 D7
6447 D7
6451 C9

Mono Carrier: Tuner IF



0283 C7
0285 C7
1000 B3
1001 B6
1003 B1
2001 B2
2002 B3
2003 C3
2004 C3
2005 B5
2006 B1
2007 B5
3001 A2
3002 B2
3003 B2
3004 B2
3005 A1
4000 C4
4001 C2
5001 B5
5002 A4
5003 A4
6001 B5
9002 A4
9282 A4

Mono Carrier: Video Processing

A 4 VIDEO PROCESSING

ITEM #	Mono	Stereo
2206	4n7	100p

VISION-IF ALIGNMT-FREE PLL DEMOD AGC/AFC VIDEO AMP
DEEMPHASIS AUDIO SWITCH VOL CONTR
CPU
I2C-BUS VST PWM-DAC I/O PORTS
1/10 PAGE MEMORY
VIDEO SWITCH VIDEO IDENT. VIDEO FILTERS
AGC CIRCUIT NARROW BAND PLL DEMODULATOR
ROM/RAM
TELETEXT CLOSED CAPTION ACQUISITION
TXT/OSD/CC DISPLAY
PAL/SEC/NTSC DECODER
BASE-BAND DELAY LINE
LUMA DELAY PEAKING BLACK STRETCH
CONTR/BRIGHTN OSD/TXT INSERT CCC WHITE-P ADJ
H/V SYNC SEP H-OSC + PLL
H-DRIVE 2nd LOOP H-SHIFT
V-DRIVE + GEOMETRY
EW GEOMETRY
RGB/YUV INSERT RGB/YUV MATRIX SATURATION YUV/RGB/MATRIX

FOR ITV ONLY
FOR YUV ONLY
To 1300 of CRT PANEL **B 1**

3139 123 5596.1
CL 36532044_004.eps 200603

Mono Carrier: Audio Processing

A5 AUDIO PROCESSING (STEREO + SAP)

AUDIO SOUND PROCESSOR

SOUND MULTIPLEX DECODER

ITEM	MONO	BTSC STEREO
4841	---	JMP
4842	---	JMP
4845	JMP	---

I830: 1V / div DC, 1ms / div

I836: 1V / div DC, 1ms / div

I847: 0.5V / div DC, 1ms / div

I848: 0.5V / div DC, 1ms / div

3139 123 5596.1

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200603

1821 A1
2821 A4
2822 B4
2823 D2
2824 D3
2825 B4
2826 A4
2827 B5
2828 E3
2829 E3
2830 F7
2831 E3
2832 C3
2833 B5
2834 A2
2835 C3
2836 C3
2837 B2
2838 E7
2839 D6
2841 C8
2842 B10
2843 B10
2844 C8
2845 D8
2846 D8
2847 D7
2848 D8
2849 D8
2850 E8
2851 E8
2852 E8
2855 C9
2856 C9
2857 D9
2858 E9
2859 E9
2860 E9
2861 B5
2862 A4
2863 D7
3822 D2
3823 D2
3824 C2
3825 B2
3826 C2
3827 E5
3828 E5
3841 C8
3842 D9
3843 D9
3852 E8
4821 B8
4822 B8
4841 E10
4842 E10
4843 C10
4844 C10
4845 D10
4847 A3
4848 A3
4849 B2
4850 C2
4851 C3
5821 A4
5841 D10
7821 B3
7841 C8
9821 F11

Mono Carrier: Audio Amplifier

A6 AUDIO_AMPLIFIER + MONO_SOUND_PROCESSING

Vaudio (Vaux)
+5V
9921
4921 RES
3901 1K
2901 L RES
3902 3K3
2903 1u
* 7901 AN7522N
3V7
11V8
STB
VCC
Main_OutL
A4
F901
9903 RES
3903 15K
3909 330K
3910 330K
2904 1u
1V4 6 CH1-IN
1V4 8 CH2-IN
0V3 9 VOL
GNDCH1
GNDINP
GNDCH2
2 5V2 CH1+
4 5V2 CH1-
10 5V2 CH2-
12 5V2 CH2+
STEREO OUTPUT
TV_BUZZER
A4
3908 330K
3904 10K
2905 1n
2951 820p
Main_OutR
A4
F903
9905 RES
3905 15K
2906 1u
3906 *
2907 1n
2952 820p
FILAMENT
2908 10u 16V
3911 100K
6908 BZX384-C2V7
6909 1N4148
VOLUME
A4
3907 3K3
2909 10u
* 7902 AN7523N
3V8
13V5
STB
VCC
1V4 6 CH1-IN
0V4 9 VOL
2 6V CH1+
4 6V CH1-
GNDINP
NC
GNDCH1
MONO OUTPUT
4922
AmpOutR+ A7
AmpOutL+ A7
AmpOutL_Pos A7
AmpOutR_Pos A7
F905
F906
* 0246
AmpOutL_Neg
AmpOutL_Pos
9901 RES
F908
9902 RES
AmpOutR_Pos
AmpOutR_Neg
F907
5
4
3
2
1
L
R
2947 100p
2948 100p
2949 100p
2950 100p

SPEAKER	
2 X 5W	16 ohm
2 X 3W	8 ohm
2 X 1W	8 ohm

*	3906	7901	7902	0246
STEREO	YES	AN7522N	-	5 Pin
MONO	NO	-	AN7523N	3 Pin

Vaudio (Vaux)
9565 RES
6565 1N4148
Vaux
0251
+5V
3551 10K
ITV_Vbatt
EH-B
FOR ITV ONLY

F901 0.5V / div AC 1ms / div
F903 0.5V / div AC 1ms / div
F905 0,5V / div AC 1ms / div
F906 0,5V / div AC 1ms / div
F907 0.5V / div AC 1ms / div
F908 0.5V / div AC 1ms / div

CL 36532044_006.eps
200603

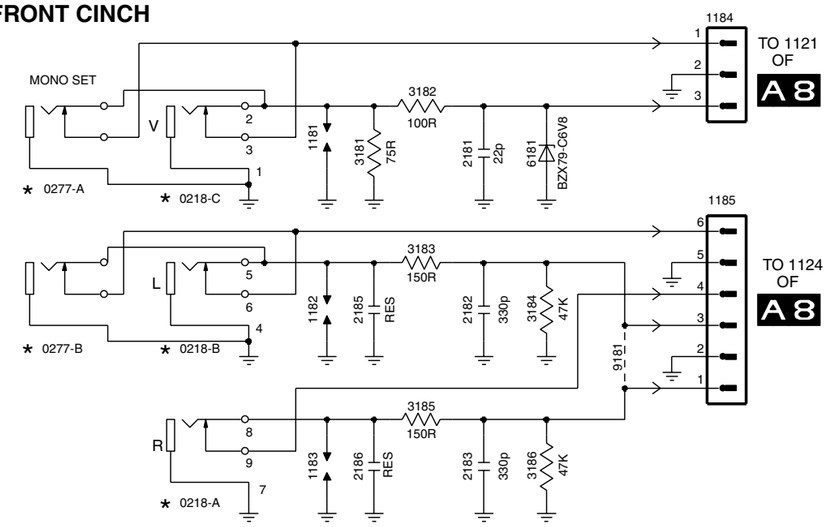
3139 123 5596.1

0246 B10
0251 F2
2901 A6
2903 A5
2904 B4
2905 B4
2906 C4
2907 C4
2908 C2
2909 D4
2947 C8
2948 C9
2949 C9
2950 C9
2951 B5
2952 C5
3551 F2
3901 A4
3902 A4
3903 B3
3904 B4
3905 C3
3906 C4
3907 D4
3908 B2
3909 B3
3910 B3
3911 C3
4921 A3
4922 C8
6565 F2
6908 D2
6909 D3
7901 B6
7902 D6
9565 F2
9901 B8
9902 B8
9903 B3
9905 C3
9921 A3

Mono Carrier: Font I/O + Control + HP

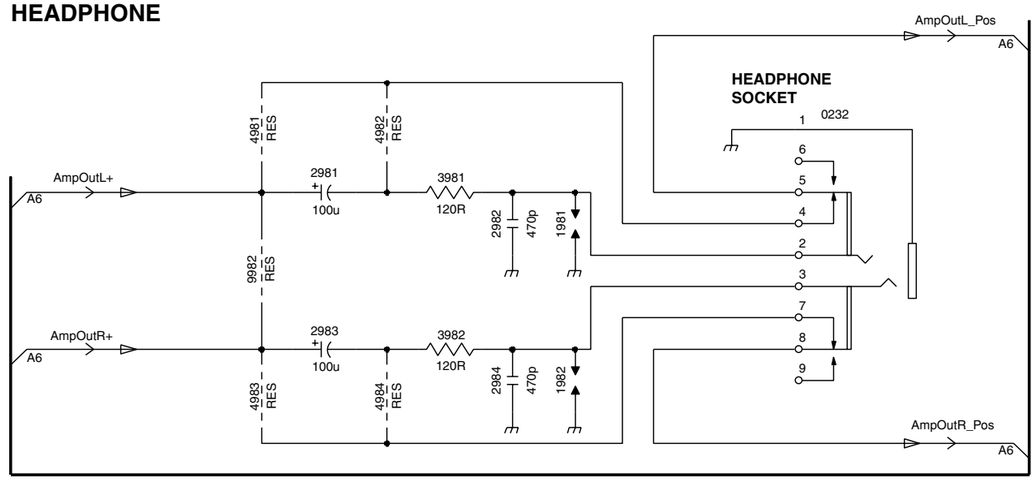
A7 FRONT IO + FRONT CONTROL + HEADPHONE

FRONT CINCH

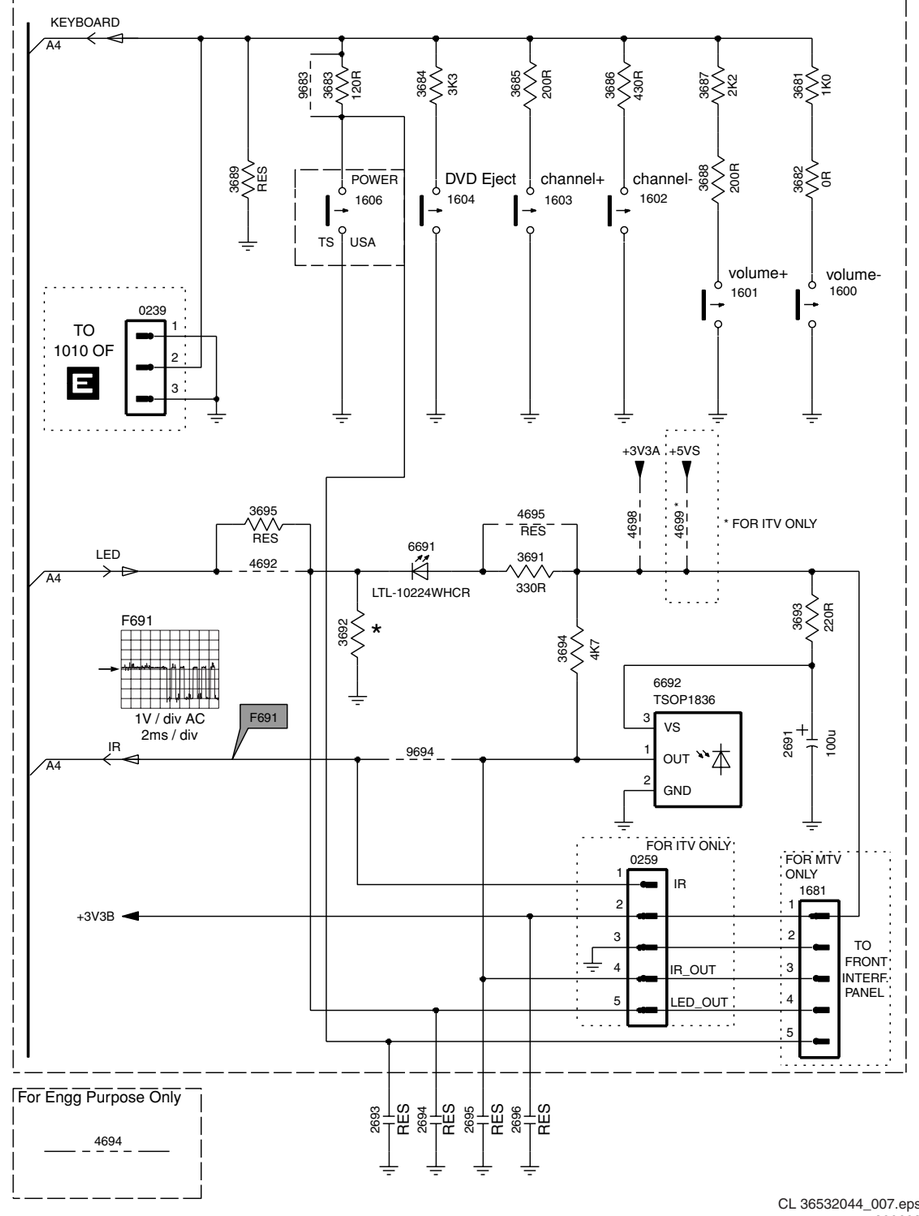


ITEM	MONO	STEREO
0218	NO	YES
0277	YES	NO

HEADPHONE



FRONT CONTROL



For Engg Purpose Only

4694

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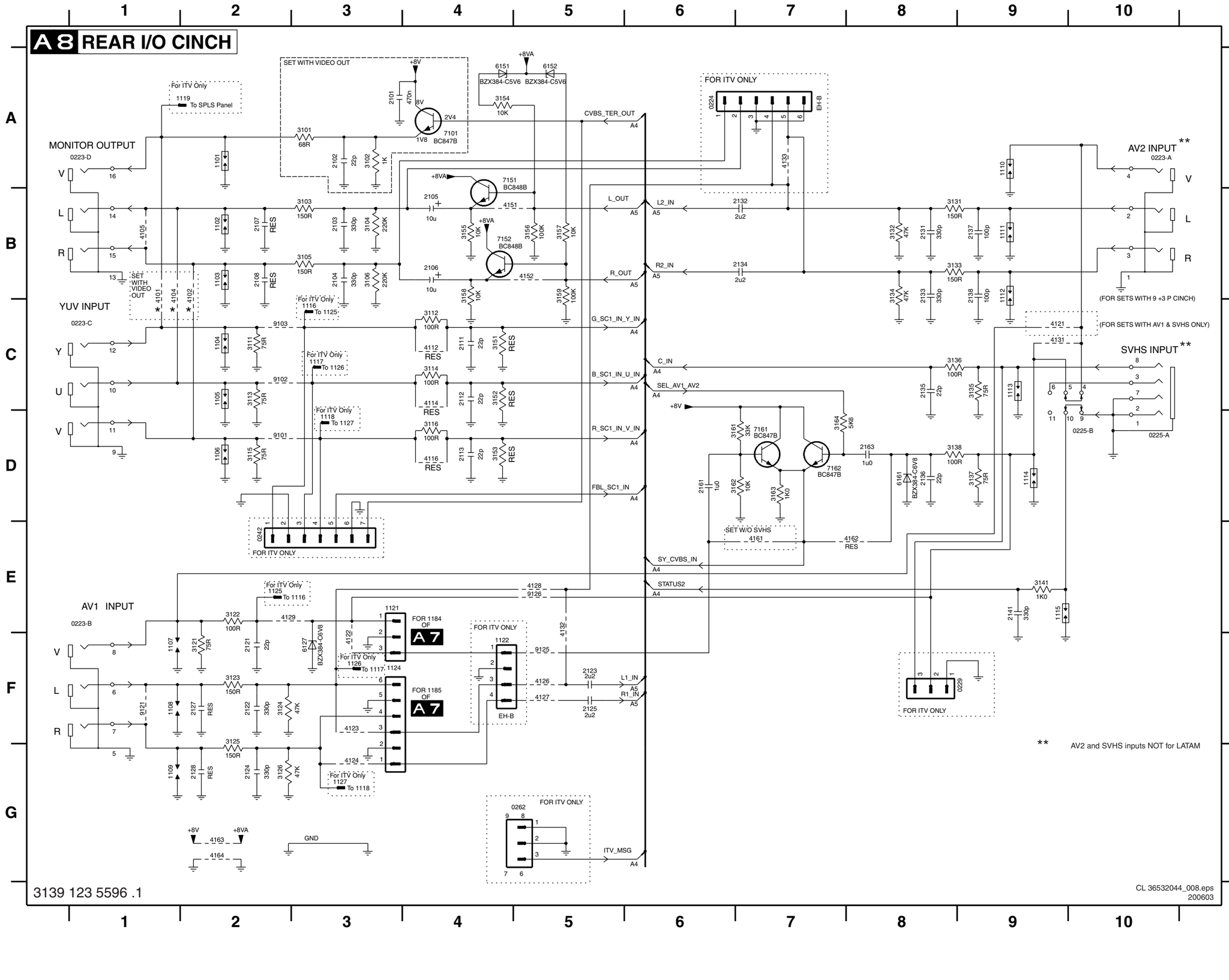
200603

0218-A C1
0218-B B1
0218-C B1
0232 E4
0239 B6
0259 E8
0277-A B1
0277-B B1
1181 A2
1182 B2
1183 C2
1184 A4
1185 B4
1600 B9
1601 B9
1602 B8
1603 B8
1604 B8
1606 B7
1681 E9
1981 E3
1982 F3
2181 A3
2182 B3
2183 C3
2185 B2
2186 C2
2691 D9
2693 F7
2694 F7
2695 F8
2696 F8
2981 E2
2982 E3
2983 F2
2984 F3
3181 A2
3182 A2
3183 B2
3184 B3
3185 C2
3186 C3
3681 A9
3682 B9
3683 A7
3684 A7
3685 A8
3686 A8
3687 A9
3688 B9
3689 B6
3691 D8
3692 D7
3693 D9
3694 D8
3695 C7
3981 E2
3982 F2
4692 D7
4694 F6
4695 C8
4698 C8
4699 C9
4981 E2
4982 E2
4983 F2
4984 F2
6181 A3
6691 D7
6692 D8
9181 B3
9683 A7
9694 D7
9982 E2

Mono Carrier: Rear I/O Cinch



0223-A A10	3154 A4
0223-B E1	3155 B4
0223-C C1	3156 B5
0223-D A1	3157 B5
0224 A6	3158 B4
0225-A D10	3159 B5
0225-B D10	3161 D7
0229 F9	3162 D7
0242 E2	3163 D7
0262 G5	3164 D7
1101 A2	4101 B1
1102 B2	4102 B2
1103 B2	4104 B1
1104 C2	4105 B1
1105 C2	4112 C4
1106 D2	4114 C4
1107 F1	4116 D4
1108 F1	4121 C9
1109 G1	4122 F3
1110 A9	4123 F3
1111 B9	4124 G3
1112 B9	4126 F5
1113 C9	4127 F5
1114 D9	4128 E5
1115 E9	4129 E2
1116 C3	4131 C9
1117 C3	4132 E5
1118 D3	4133 A7
1119 A2	4151 B4
1121 E3	4152 B5
1122 F4	4161 E7
1124 F3	4162 E8
1125 E2	4163 G2
1126 F3	4164 G2
1127 G3	6127 F3
2101 A3	6151 A4
2102 A3	6152 A5
2103 B3	6161 D8
2104 B3	7101 A4
2105 B4	7151 A5
2106 B4	7152 B4
2107 B2	7161 D7
2108 B2	7162 D7
2111 C4	9101 D2
2112 C4	9102 C2
2113 D4	9103 C2
2121 F2	9121 F1
2122 F2	9125 F5
2123 F5	9126 E5
2124 G2	
2125 F5	
2127 F2	
2128 G2	
2131 B8	
2132 B7	
2133 B8	
2134 B7	
2135 C8	
2136 D8	
2137 B9	
2138 B9	
2141 E9	
2161 D6	
2163 D8	
3101 A3	
3102 A3	
3103 B3	
3104 B3	
3105 B3	
3106 B3	
3111 C2	
3112 C4	
3113 C2	
3114 C4	
3115 D2	
3116 D4	
3121 F2	
3122 E2	
3123 F2	
3124 F2	
3125 F2	
3126 G2	
3131 B8	
3132 B8	
3133 B8	
3134 B8	
3135 C9	
3136 C8	
3137 D9	
3138 D8	
3141 E9	
3151 C4	
3152 C4	
3153 D4	

Mono Carrier: Diversity Table for Rear I/O

Diversity Table For A8 Rear IO Cinch

ITEM	CN-R.11/10-YUV-F.11-ST-LA/NA	CN-R.11/10-F.11-MN-LA L03S	CN-R.11/10-YUV-ST-LA/NA L03S	CN-F.11-ST-LA/NA L03S	CN-F.11-MN-LA	CN-R.11/10-MN-LA
2101	470N	470N	470N	-	-	470N
2102	22P	22P	22P	-	-	22P
2103	330P	330P	330P	-	-	330P
2104	330P	-	330P	-	-	-
2105	10U	10U	10U	-	-	10U
2106	10U	-	10U	-	-	-
2111	22P	-	22P	-	-	-
2112	22P	-	22P	-	-	-
2113	22P	-	22P	-	-	-
2121	-	-	22P	-	-	22P
2122	-	-	330P	-	-	330P
2123	-	1U	1U	1U	1U	1U
2124	-	-	330P	-	-	-
2125	1U	-	1U	1U	-	-
2132	1U	-	1U	1U	-	-
2134	1U	-	1U	1U	-	-
2181	22P	22P	-	22P	22P	-
2182	330P	330P	-	330P	330P	-
2183	330P	-	-	330P	-	-
2210	220N	220N	220N	220N	220N	220N
2211	1N	-	1N	1N	-	1N
2231	22N	-	22N	22N	-	22N
2232	22N	-	22N	22N	-	22N
2233	22N	-	22N	22N	-	22N
2842	JMP	-	JMP	-	-	-
2843	JMP	JMP	JMP	-	-	JMP
3101	68R	68R	68R	-	-	68R
3102	1K	1K	1K	-	-	1K
3103	150R	150R	150R	-	-	150R
3104	220K	220K	220K	-	-	220K
3105	150R	-	150R	-	-	-
3106	220K	-	220K	-	-	-
3111	75R	-	75R	-	-	-
3112	100R	-	100R	-	-	-
3113	75R	-	75R	-	-	-
3114	100R	-	100R	-	-	-
3115	75R	-	75R	-	-	-
3116	100R	-	-	-	-	75R
3121	-	-	100R	-	-	100R
3122	JMP	JMP	150R	-	-	150R
3123	JMP	JMP	47K	-	-	47K
3124	-	-	150R	-	-	-
3125	JMP	-	47K	-	-	-
3126	-	-	-	-	-	-
3181	75R	75R	-	75R	75R	-
3182	100R	100R	-	100R	100R	-
3183	150R	150R	-	150R	150R	-
3184	47K	47K	-	47K	47K	-
3185	150R	-	-	150R	-	-
3186	47K	-	-	47K	-	-
3210	100R	100R	100R	100R	100R	100R
3231	560R	-	560K	560R	-	560R
3232	1K	-	1K	1K	-	1K
4101	-	JMP	-	-	-	JMP
4102	-	-	-	-	-	-
4104	-	JMP	-	-	-	JMP
4122	-	-	JMP	-	-	JMP
4123	-	-	JMP	-	-	JMP
4124	-	-	JMP	-	JMP	-
4126	JMP	JMP	JMP	JMP	-	JMP
4127	JMP	-	JMP	JMP	-	-
4129	JMP	JMP	JMP	-	-	JMP
4132	JMP	-	JMP	JMP	-	-
4133	JMP	-	JMP	JMP	-	-
4151	JMP	JMP	JMP	-	-	JMP
4152	JMP	-	JMP	-	-	-
4161	JMP	JMP	JMP	JMP	JMP	JMP
6127	-	-	BZX79-C6V8	-	-	BZX384-C6V8
6181	BZX79-C6V8	BZX79-C6V8	-	BZX79-C6V8	BZX79-C6V8	-
7101	BC847B	BC847B	BC847B	-	-	BC847B
9101	JMP	-	JMP	-	-	-
9102	JMP	-	JMP	-	-	-
9103	JMP	-	JMP	-	-	-
9125	JMP	JMP	JMP	JMP	JMP	JMP

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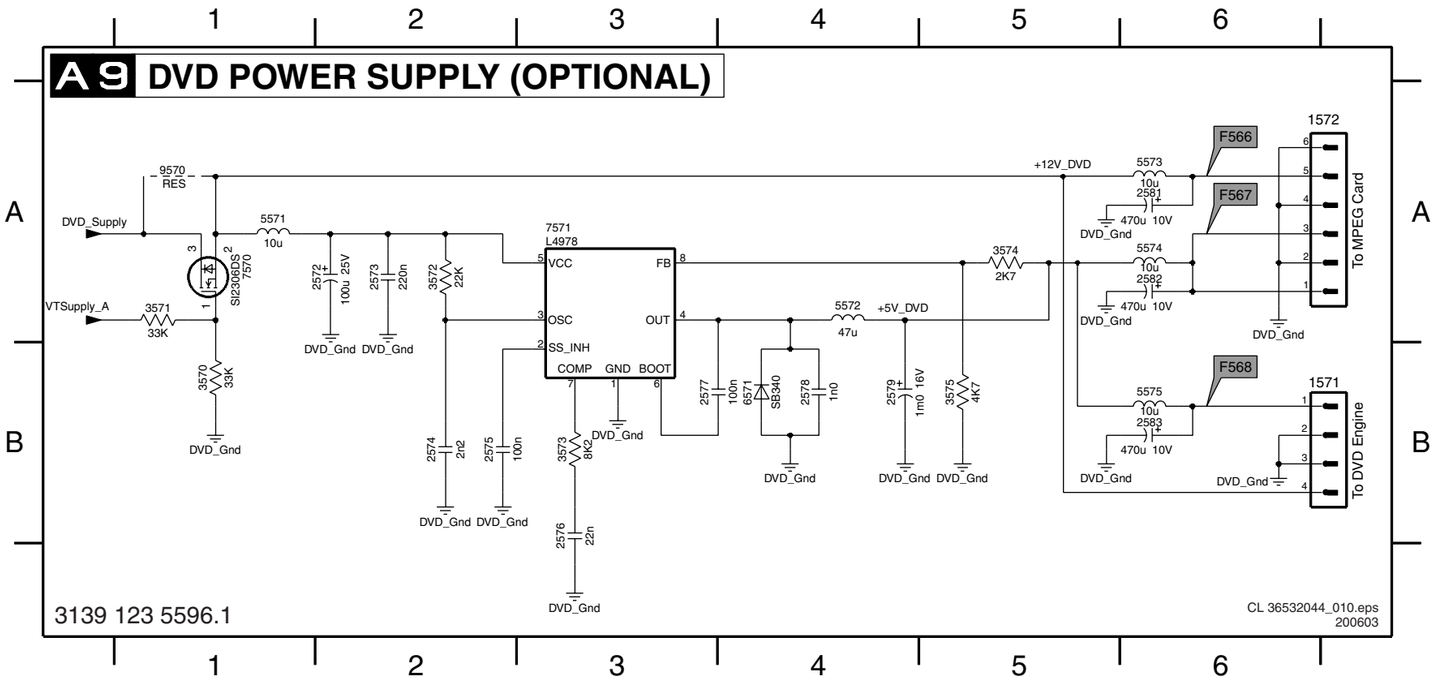
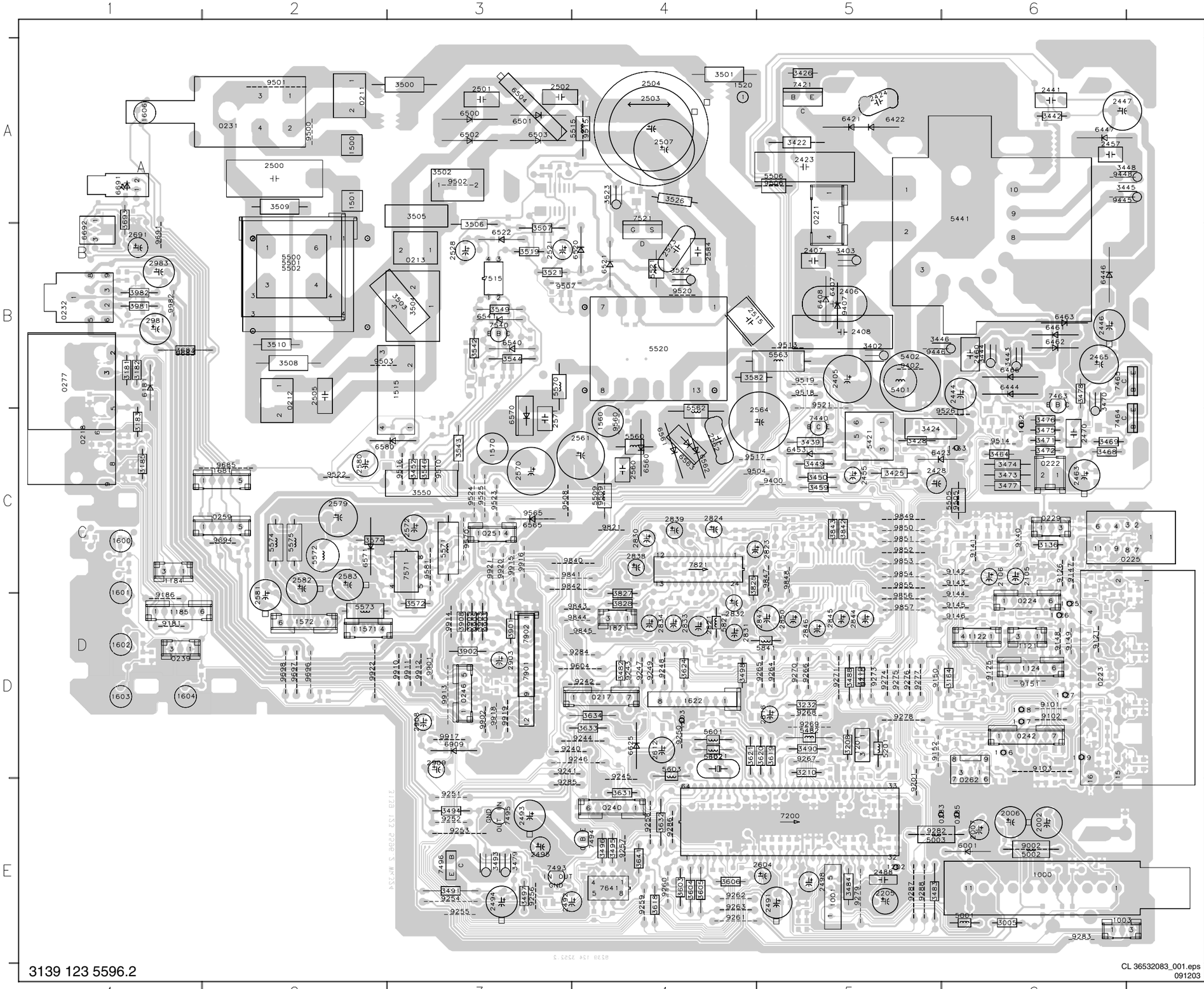
Mono Carrier: DVD Power Supply (Optional)



1571 B6
1572 A6
2572 A2
2573 A2
2574 B2
2575 B2
2576 B3
2577 B3
2578 B4
2579 B4
2581 A6
2582 A6
2583 B6
3570 B1
3571 A1
3572 A2
3573 B3
3574 A5
3575 B5
5571 A1
5572 A4
5573 A6
5574 A6
5575 B6
6571 B4
7570 A1
7571 A3
9570 A1

Layout Mono Carrier: (Top Side)



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091203

0211 A2 2521 B3 3521 B3 6625 D4 9508 C3
0212 B2 2523 B4 3523 A4 6691 A1 9509 C4
0213 B3 2528 B3 3526 A4 6692 B1 9510 C3
0217 D4 2560 C4 3527 B4 6909 D3 9513 B5
0218 C1 2561 C4 3542 B3 7200 E5 9514 C6
0221 A5 2562 C4 3543 C3 7421 A5 9515 A4
0222 C6 2564 C5 3544 B3 7440 C5 9516 C3
0223 D6 2570 C3 3546 C3 7463 B6 9517 C4
0224 D6 2571 C3 3549 B3 7464 C6 9518 B5
0225 C7 2572 C3 3550 C3 7465 B6 9519 B5
0229 C6 2579 C2 3572 D3 7493 E3 9520 B4
0231 A2 2580 C2 3574 C2 7494 E4 9521 B5
0232 B1 2581 D2 3582 B4 7495 E3 9522 C2
0239 D1 2582 C2 3603 E4 7496 E3 9523 C3
0240 E4 2583 C2 3604 E4 7515 B3 9524 C3
0242 D6 2584 B4 3605 E4 7521 A4 9525 C3
0246 D3 2604 E5 3606 E4 7540 B3 9526 C6
0251 C3 2612 D4 3618 E4 7571 C3 9560 C4
0259 C2 2616 D5 3619 D5 7641 E4 9565 C3
0262 E6 2691 B1 3620 D5 7821 C4 9570 C3
0277 B1 2821 D4 3621 D4 7901 D3 9581 C3
0283 E5 2823 C5 3624 D4 7902 D3 9604 D4
0285 E6 2824 C4 3631 E4 9002 E6 9683 B1
1000 E6 2830 C4 3632 E4 9101 D6 9685 C2
1001 E5 2831 D4 3633 D4 9102 D6 9691 B1
1003 E6 2832 D4 3634 D4 9103 D6 9694 C2
1116 D6 2833 D4 3641 E4 9121 D6 9696 D2
1117 D6 2834 D4 3683 B1 9125 D6 9697 D2
1118 D6 2838 C4 3693 A1 9126 C6 9698 D2
1119 D6 2839 C4 3825 C4 9140 C6 9821 C4
1121 D6 2844 D5 3827 D4 9141 C6 9840 C4
1122 D6 2845 D5 3828 D4 9142 C6 9841 C3
1124 D6 2846 D5 3842 C5 9143 C6 9842 C3
1125 D6 2847 D5 3843 C5 9144 D6 9843 D4
1126 D6 2850 D5 3901 D3 9145 D6 9844 D4
1127 D6 2903 D3 3902 D3 9146 D6 9845 D4
1184 C1 2908 D3 3903 D3 9147 C6 9847 C5
1185 D1 2909 D3 3905 D3 9148 D6 9848 C5
1201 D5 2981 B1 3908 D3 9149 D6 9849 C5
1202 E5 2983 B1 3981 B1 9150 D5 9850 C5
1203 D4 3005 E6 3982 B1 9151 D6 9851 C5
1462 C6 3136 C6 5001 E6 9152 D5 9852 C5
1463 C6 3164 D6 5002 E6 9181 D1 9853 C5
1500 A2 3181 B1 5003 E5 9186 D1 9854 C5
1501 A2 3182 B1 5201 D5 9201 E5 9855 C5
1508 B4 3183 C1 5401 B5 9240 D3 9856 D5
1509 B4 3185 C1 5402 B5 9241 D3 9857 D5
1515 B3 3208 D5 5421 C5 9242 D4 9901 D3
1516 B4 3210 D5 5441 A6 9243 D4 9902 D3
1520 A4 3232 D5 5482 D5 9244 D4 9903 D3
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1604 D1 3445 A6 5570 B3 9257 E4 9921 C3
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1681 C2 3450 C5 5574 C2 9261 E4
1821 D4 3452 C3 5575 C2 9262 E4
2002 E6 3459 C5 5601 D4 9263 E4
2006 E6 3464 C6 5602 D4 9264 D5
2007 E6 3468 C6 5603 D4 9265 D5
2105 C6 3469 C6 5821 D4 9266 D5
2106 C6 3470 B6 5841 D5 9267 D5
2205 E5 3471 C6 6001 E6 9268 D5
2405 B5 3472 C6 6181 B1 9269 D5
2406 B5 3473 C6 6407 B5 9270 D5
2407 B5 3474 C6 6408 B5 9271 D5
2408 B5 3475 C6 6421 A5 9273 D5
2423 A5 3476 C6 6422 A5 9274 D5
2424 A5 3477 C6 6423 C5 9275 D5
2428 C5 3478 B6 6444 B6 9276 D5
2441 A6 3479 E3 6446 B6 9277 D5
2444 B6 3482 D4 6447 A6 9278 D5
2446 B6 3483 E5 6453 C5 9279 E5
2447 A6 3484 E5 6461 B6 9282 E5
2455 C5 3488 D5 6462 B6 9283 E6
2457 A6 3490 D5 6463 B6 9284 D4
2460 B6 3491 E3 6466 B6 9285 E3
2463 C6 3493 E3 6500 A3 9286 E4
2465 B6 3494 E3 6501 A3 9287 E5
2470 C6 3495 E4 6502 A3 9288 E5
2488 E5 3496 E4 6503 A3 9400 C5
2491 E5 3497 E3 6504 A3 9402 B5
2492 E3 3498 D4 6520 B4 9407 B5
2493 E3 3500 A3 6521 B4 9410 D5
2494 E3 3501 A4 6522 B3 9445 A6
2495 E3 3502 A3 6540 B3 9446 B5
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2503 A4 3507 B3 6563 C4 9503 B2
2504 A4 3508 B2 6565 C3 9504 C4
2505 B2 3509 A2 6570 C3 9505 C6
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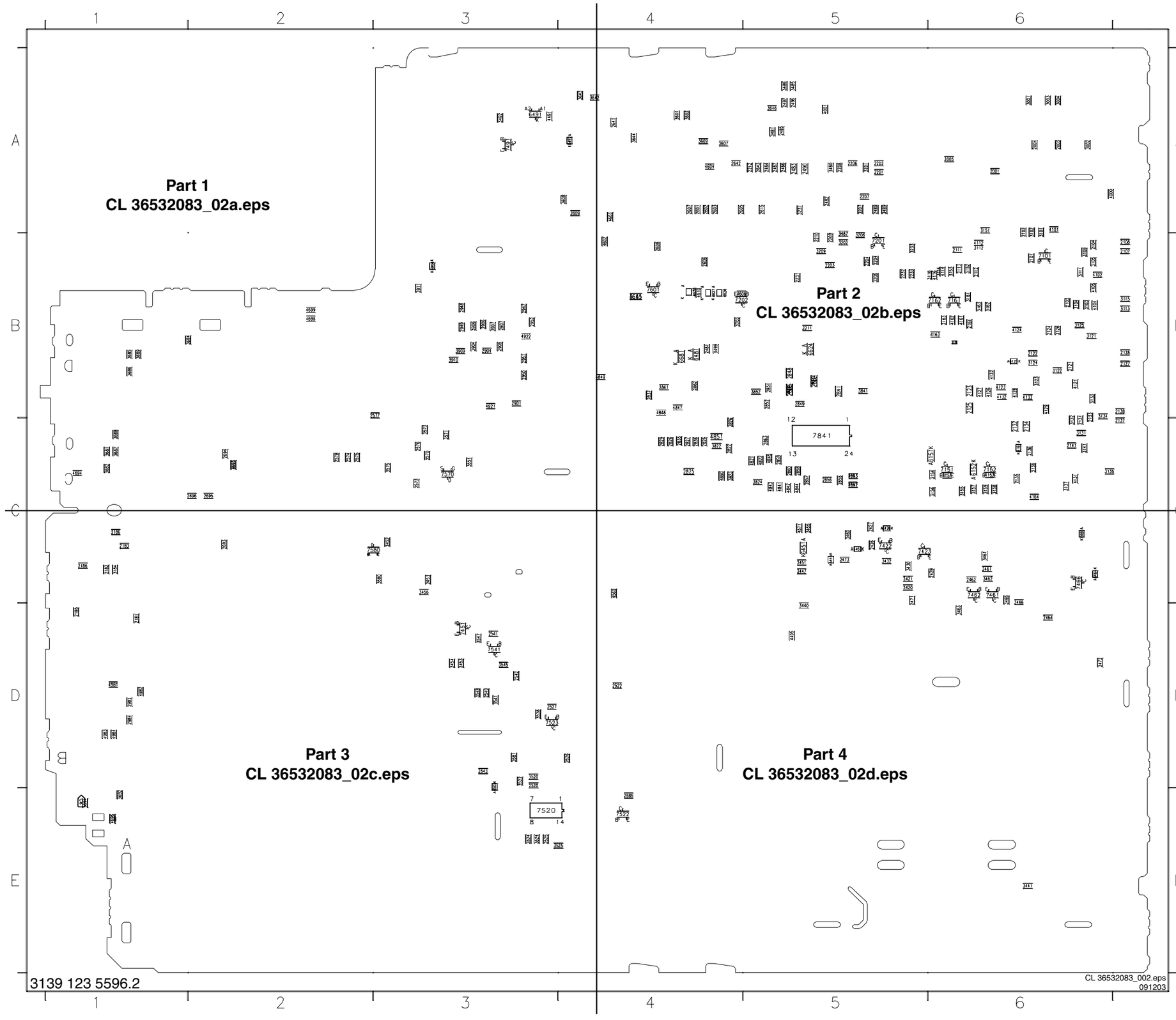
Layout Mono Carrier (Overview Bottom Side)



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2005 A6 2696 C2 3454 D3 4692 C2
2101 B6 2822 C4 3455 C5 4694 C1
2102 A6 2825 C4 3456 C3 4695 E1
2103 B6 2826 C4 3460 C5 4698 B2
2104 B6 2827 C4 3461 C6 4699 B2
2107 B7 2828 C4 3462 C6 4821 C5
2108 B7 2829 C4 3463 D6 4822 C5
2111 B6 2835 C4 3465 C6 4841 C5
2112 B6 2836 C4 3466 C6 4842 C5
2113 B6 2837 B4 3480 A5 4843 C5
2121 B6 2841 B5 3481 A5 4844 C5
2122 B6 2842 C5 3485 A5 4845 C5
2123 B6 2843 C5 3486 A5 4847 B4
2124 B6 2848 B5 3487 B5 4848 B4
2125 B6 2849 B5 3489 A5 4849 B4
2127 B7 2851 B5 3492 A3 4850 C4
2128 B7 2852 B5 3499 B4 4851 C4
2131 C6 2855 C5 3520 D3 4852 C5
2132 C6 2856 C5 3522 D3 4853 C5
2133 B6 2857 C5 3524 E3 4921 B3
2134 C6 2858 C5 3525 E4 4922 B3
2135 C6 2859 C5 3528 D3 4981 D1
2136 C6 2860 C5 3541 D3 4982 D1
2137 C7 2861 B4 3545 D3 4983 D1
2138 B7 2862 B4 3547 D3 4984 D1
2141 C6 2863 C5 3548 D3 6127 B6
2161 B6 2864 B5 3551 C3 6151 C6
2163 B6 2865 B5 3570 C3 6152 C6
2181 D1 2901 B3 3571 C3 6161 C6
2182 C1 2904 B3 3573 C3 6426 C5
2183 C1 2905 B3 3575 C3 6445 C5
2185 D1 2906 B3 3580 C3 6451 C5
2186 C1 2907 B3 3581 D3 6452 C5
2201 A5 2947 B3 3601 A4 6460 C6
2202 A5 2948 B3 3602 A4 6464 C6
2203 B5 2949 B3 3607 A4 6481 B4
2204 B5 2950 B3 3608 A4 6491 A3
2206 A5 2951 B3 3609 A4 6492 A4
2207 A5 2952 B3 3642 A4 6505 D3
2208 A5 2982 D1 3643 A4 6624 B5
2209 B5 2984 D1 3644 A4 6626 B4
2210 B5 3001 A6 3645 B4 6627 B4
2211 B5 3002 A6 3646 A5 6628 B4
2212 A5 3003 A6 3681 C1 6681 B4
2231 B5 3004 A6 3682 C1 6908 B3
2232 B5 3101 A6 3684 B1 7101 B6
2233 B5 3102 A6 3685 B1 7151 C6
2420 C5 3103 B6 3686 B1 7152 C6
2421 C5 3104 B6 3687 C1 7161 B6
2426 C5 3105 B6 3688 C1 7162 B6
2427 C5 3106 B6 3689 B1 7201 B5
2429 C6 3111 B6 3691 E1 7202 B4
2452 C3 3112 B6 3692 E1 7422 C5
2453 C3 3113 B7 3694 E1 7423 C5
2461 C6 3114 B6 3695 C2 7451 D3
2462 C6 3115 B7 3822 C4 7461 C6
2464 D6 3116 B6 3823 C4 7462 C6
2471 C5 3118 B6 3824 C5 7466 C6
2472 D6 3121 B6 3826 C4 7491 A3
2473 C5 3122 B6 3841 B5 7520 E3
2481 B4 3123 B6 3852 B5 7522 E4
2482 A5 3124 B6 3904 B3 7523 D3
2483 A5 3125 B6 3906 B3 7541 D3
2484 A5 3126 B6 3907 B3 7570 C3
2485 A5 3131 C6 3909 B3 7580 C3
2486 A5 3132 C6 3910 B3 7601 B4
2487 A5 3133 B6 3911 B3 7841 C5
2489 A5 3134 B6 4000 A6
2490 A5 3135 C6 4001 A5
2496 A5 3137 C6 4101 A6
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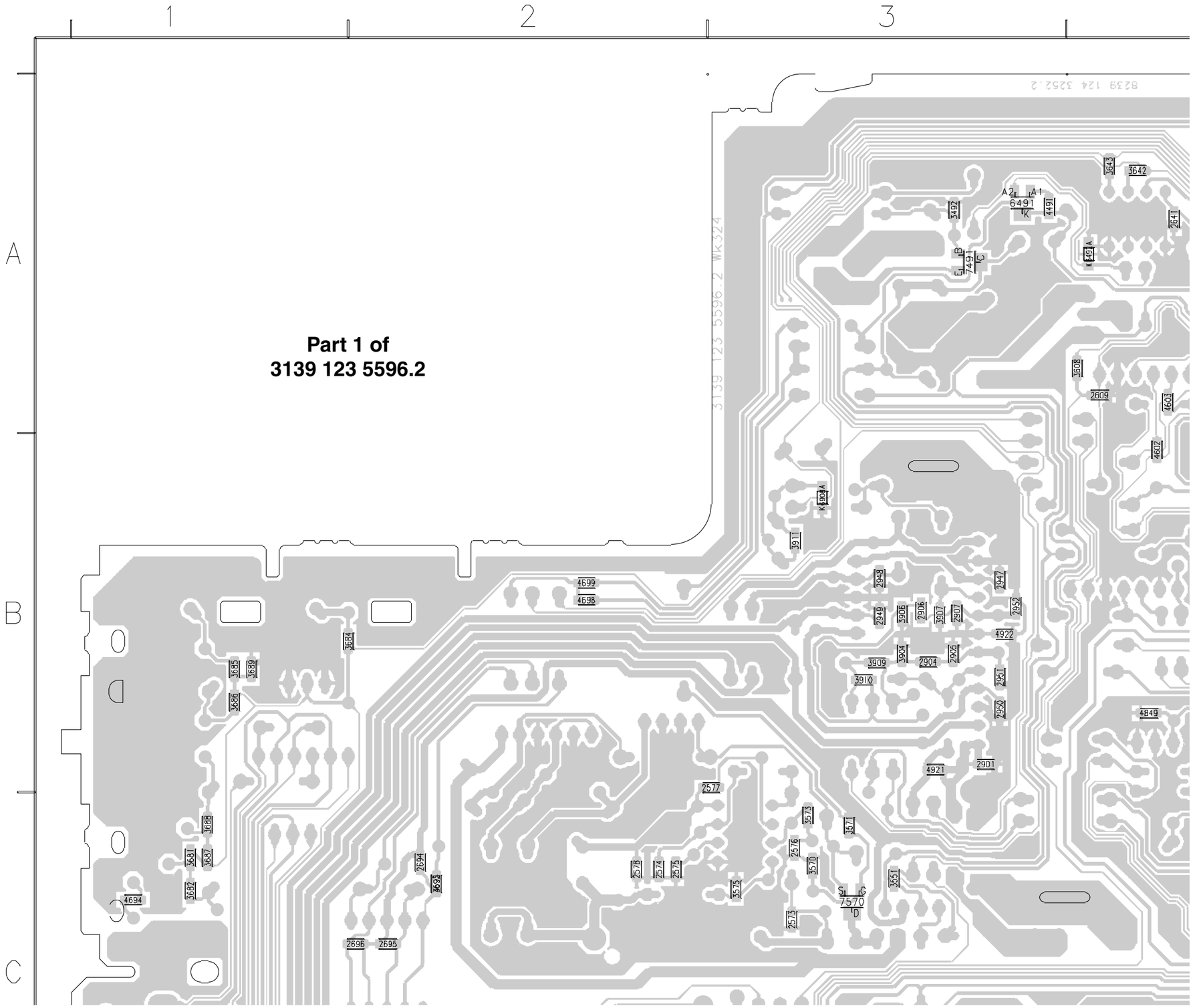
2520 D3 3141 C6 4104 B6
2522 D4 3151 A6 4105 B6
2524 E3 3152 B6 4112 B6
2525 E3 3153 B6 4114 B6
2526 D4 3154 C6 4116 B6
2527 D3 3155 C6 4121 B6
2540 D3 3156 C6 4122 B6
2541 D3 3157 C6 4123 B6
2542 D3 3158 C6 4124 B6
2543 D3 3159 C6 4126 B6
2573 C3 3161 B6 4127 B6
2574 C2 3162 B6 4128 B6
2575 C2 3163 B6 4129 B6
2576 C3 3184 C1 4131 C6
2577 B3 3186 C1 4132 B6
2578 C2 3201 A5 4133 B6
2585 E4 3202 B5 4151 C6
2601 A4 3203 B4 4152 C6
2602 A4 3204 B5 4161 B6
2603 A4 3205 B5 4162 B6
2605 A4 3206 B5 4163 B6
2606 B4 3207 A5 4164 C6
2607 A4 3209 B5 4405 D5
2608 B4 3231 A5 4491 A3
2609 A4 3233 B5 4560 C4
2615 A5 3430 C5 4571 C5
2641 A4 3432 C5 4602 B4
2642 A4 3440 D5 4603 A4
2643 A5 3441 E6 4604 A4

Layout Mono Carrier (Part 1 Bottom Side)

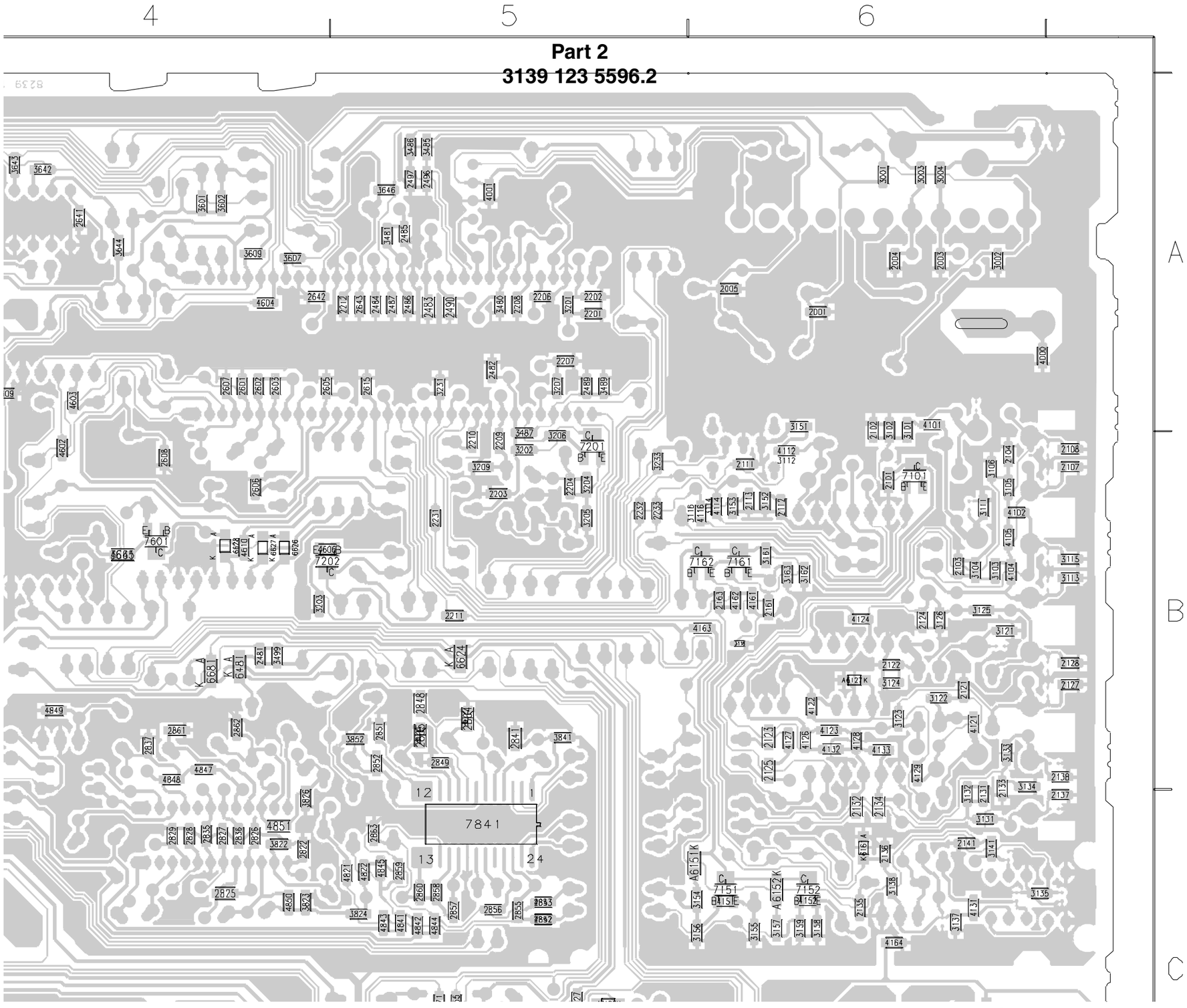
Part 1 of
3139 123 5596.2



CL 36532083_02a.eps
121203

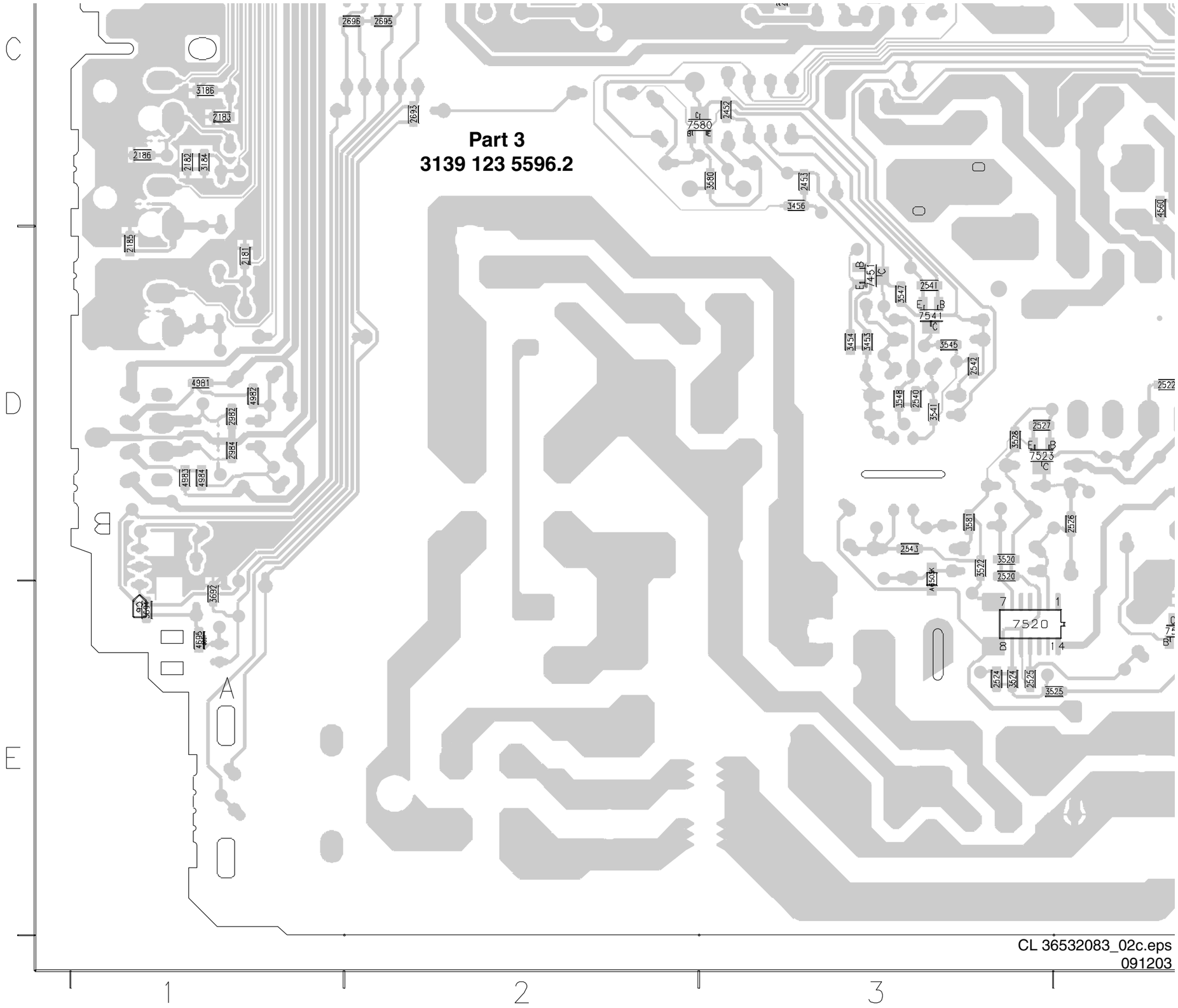
Layout Mono Carrier (Part 2 Bottom Side)

Part 2
3139 123 5596.2



CL 36532083_02b.eps
091203

Layout Mono Carrier (Part 3 Bottom Side)



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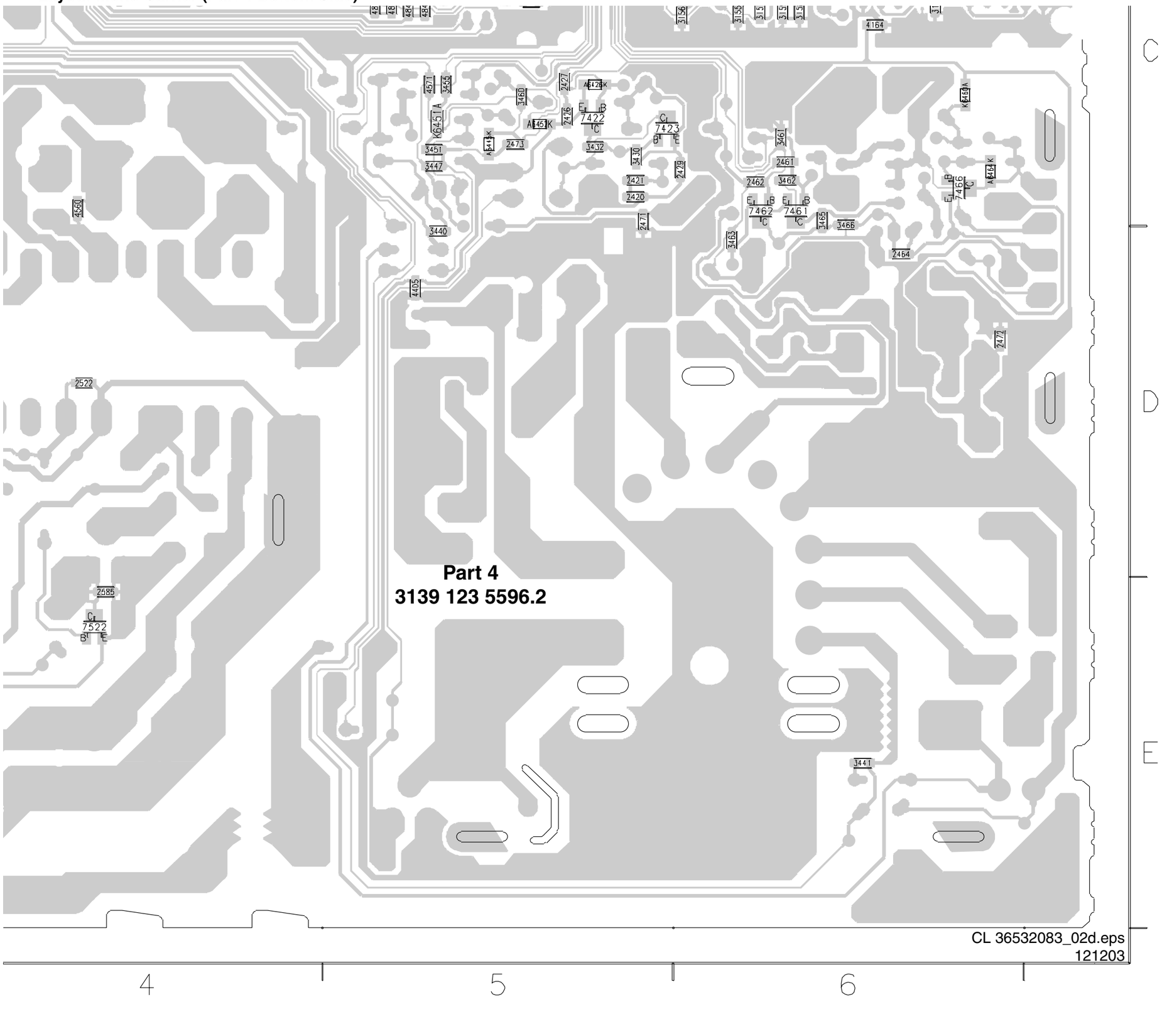
091203

Layout Mono Carrier (Part 4 Bottom Side)



Part 4
3139 123 5596.2

CL 36532083_02d.eps
121203

CRT Panel

B 1 CRT PANEL

SIZE	14"/15RF	20"/21"
1301	SOC M-NECK	-
1302	-	SOC N-NECK
3311	330R	390R
4303	-	SM JUMP
4304	SM JUMP	-
4305	SM JUMP	-
4306	-	SM JUMP

CRT	9 Pin	12 Pin
GND	Pin 1	Pin 1 & 12
VG1	Pin 6	Pin 5
Green	Pin 9	Pin 6
VG2	Pin 8	Pin 7
Red	Pin 7	Pin 8
Heater	Pin 5	Pin 9
Heater	Pin 4	Pin 10
Blue	Pin 3	Pin 11

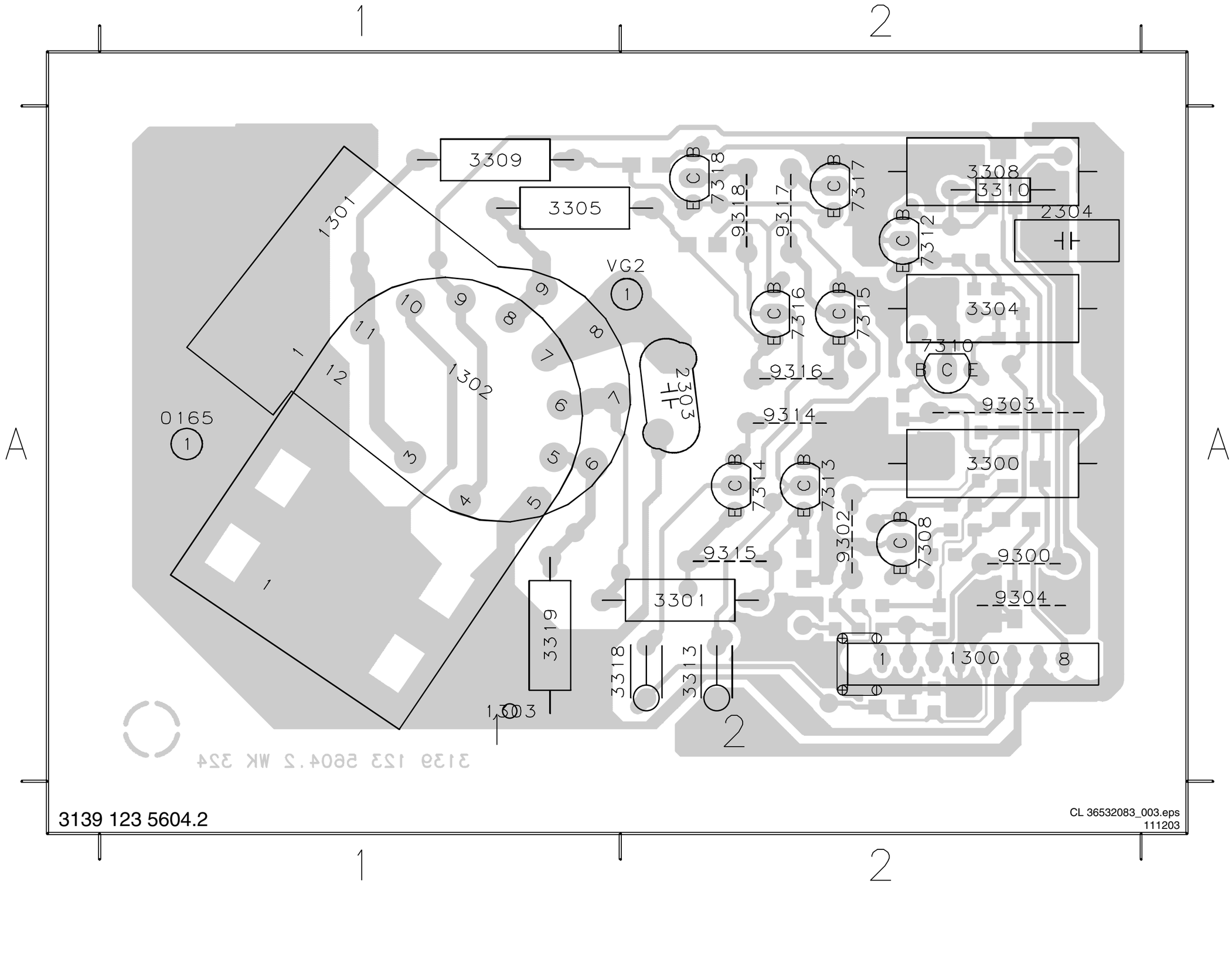
F301 1V / div DC 20µs / div
F302 1V / div DC 20µs / div
F303 1V / div DC 20µs / div
F308 50V / div DC 20µs / div
F309 50V / div DC 20µs / div
F310 50V / div DC 20µs / div

3139 123 5604.1

CL 36532044_011.eps 200603

VG2 F9
0165 A7
1300 B1
1301-1 B7
1302-A D7
1303 A7
2300 B3
2301 D4
2302 E4
2303 F2
2304 F1
2318 E4
3300 A3
3301 C5
3302 B2
3303 B3
3304 B3
3305 C5
3306 C2
3307 D3
3308 D4
3309 D5
3310 D2
3311 E4
3313 A4
3318 E4
3319 E6
4300 B2
4301 C2
4302 D2
4303 B1
4304 B1
4305 B1
4306 B1
4307 E2
6301 E3
6307 E2
6313 B4
6316 C4
6317 D4
6318 E4
7307 B2
7308 B3
7309 C2
7310 C3
7311 D2
7312 D4
7313 A4
7314 B4
7315 B4
7316 C4
7317 C4
7318 D4

Layout CRT Panel (Top Side)

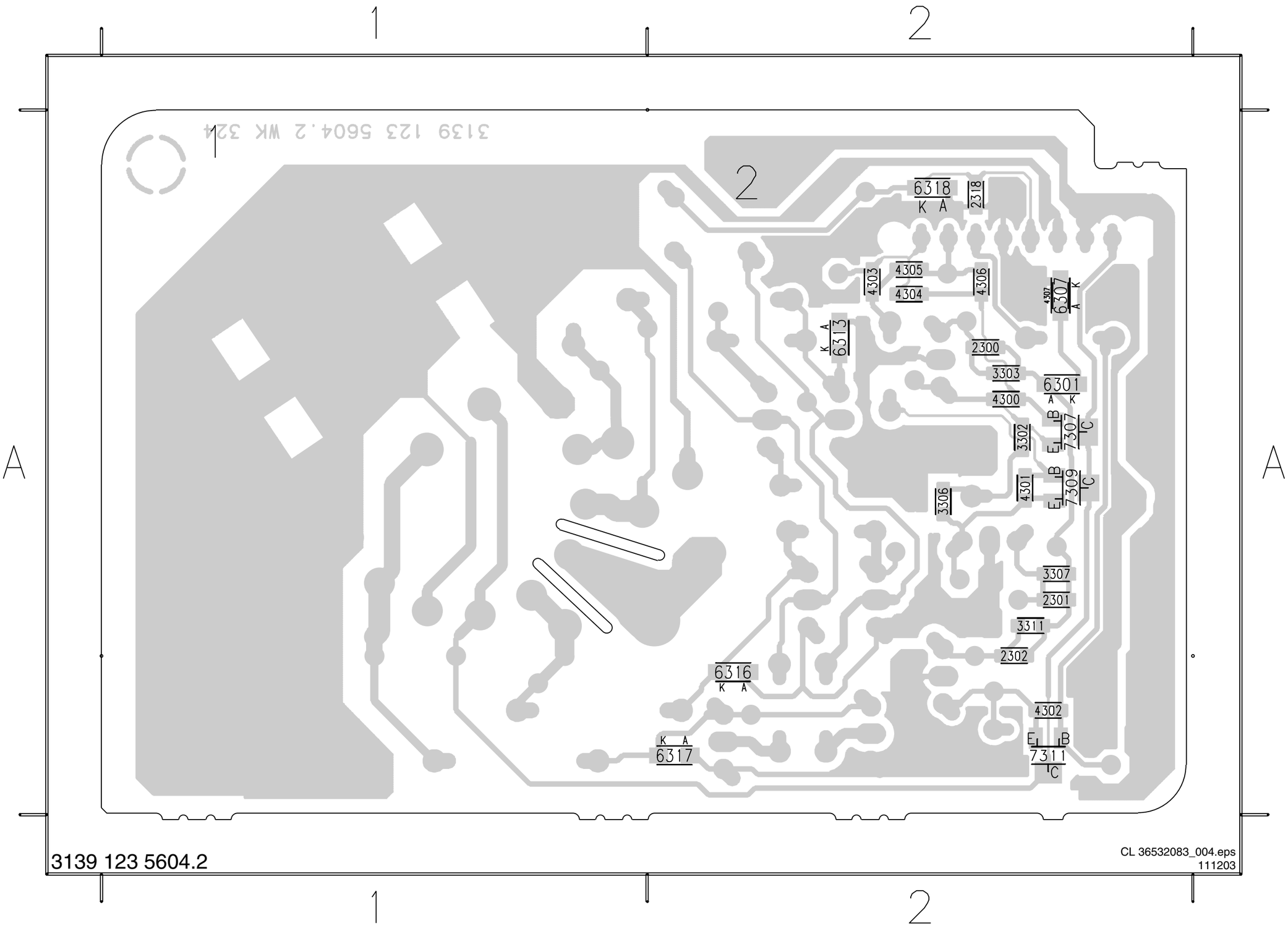


0165	A1
1300	A2
1301	A1
1302	A1
1303	A1
2303	A2
2304	A2
3300	A2
3301	A2
3304	A2
3305	A1
3308	A2
3309	A1
3310	A2
3313	A2
3318	A1
3319	A1
7308	A2
7310	A2
7312	A2
7313	A2
7314	A2
7315	A2
7316	A2
7317	A2
7318	A2
9300	A2
9302	A2
9303	A2
9304	A2
9314	A2
9315	A2
9316	A2
9317	A2
9318	A2
VG2	A1

3139 123 5604.2

CL 36532083_003.eps
111203

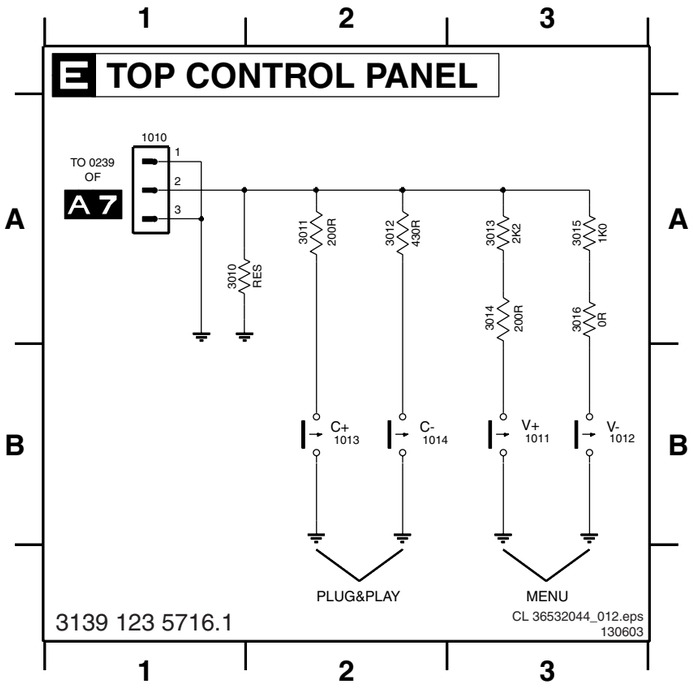
Layout CRT Panel (Bottom Side)



2300 A2
2301 A2
2302 A2
2318 A2
3302 A2
3303 A2
3306 A2
3307 A2
3311 A2
4300 A2
4301 A2
4302 A2
4303 A2
4304 A2
4305 A2
4306 A2
6301 A2
6307 A2
6313 A2
6316 A2
6317 A2
6318 A2
7307 A2
7309 A2
7311 A2

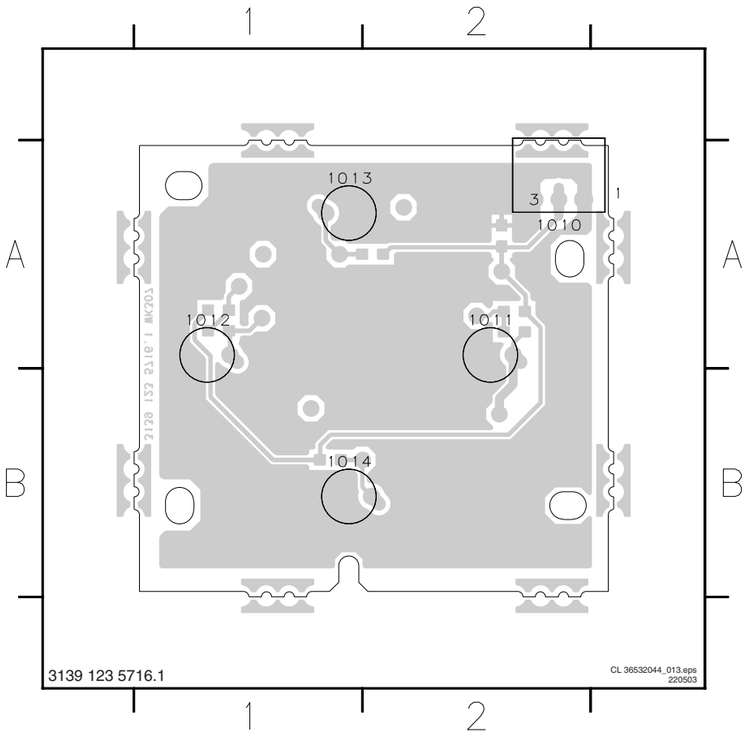
Top Control Panel

1010 A1 1012 B3 1014 B2 3011 A2 3013 A3 3015 A3
1011 B3 1013 B2 3010 A1 3012 A2 3014 A3 3016 A3



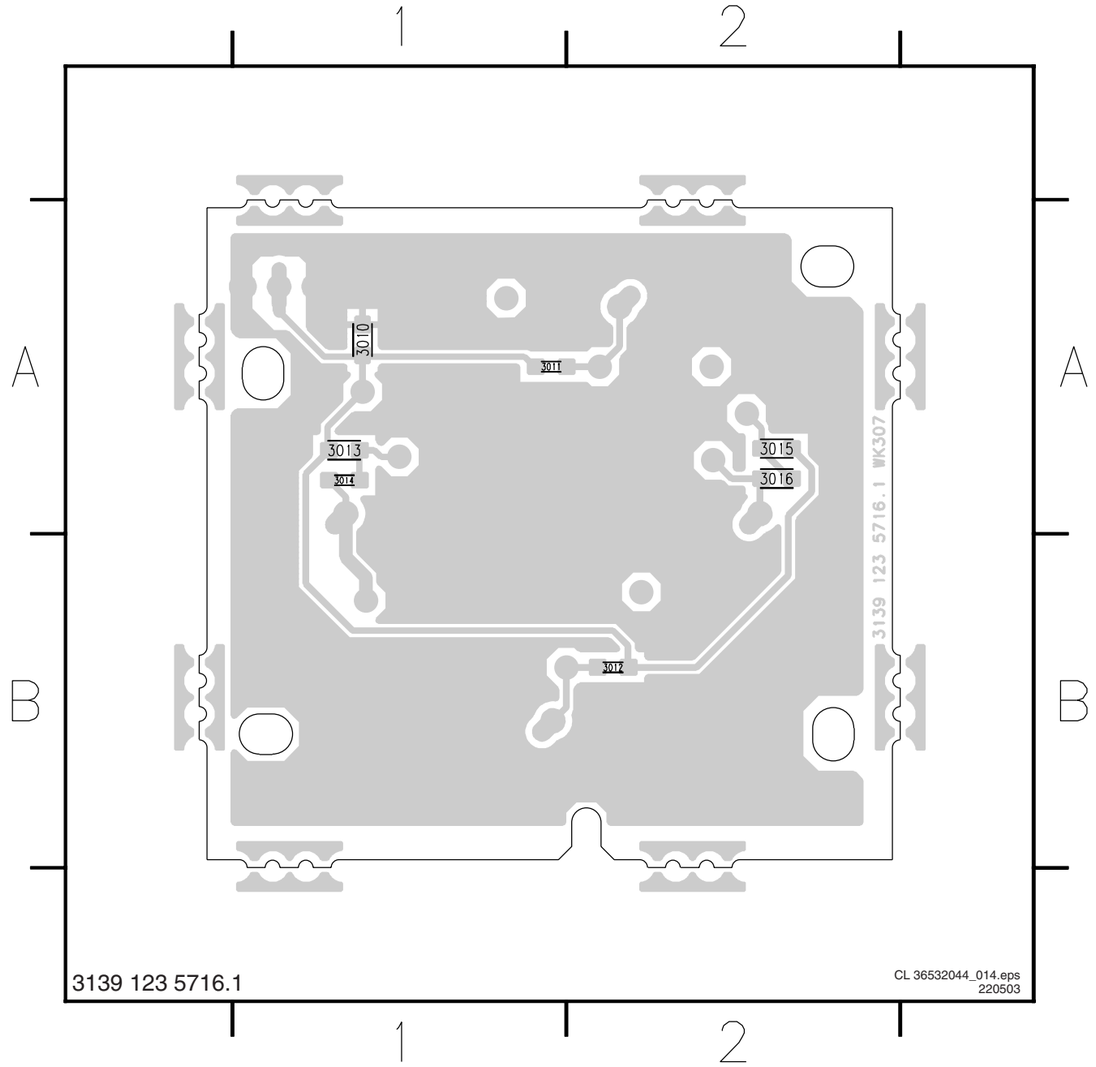
Layout Top Control Panel (Top Side)

1010 A2 1012 A1 1014 B1
1011 A2 1013 A1



Layout Top Control Panel (Bottom Side)

3010 A1 3012 B2 3014 A1 3016 A2
3011 A1 3013 A1 3015 A2



Personal Notes:

Personal Notes:

8. Alignments

Index of this chapter:

Note: The Service Default Alignment Mode (SDAM) is described in the "Service Modes, Error Codes and Fault Finding" section. SDAM menu navigation is performed by using the MENU UP, MENU DOWN, MENU LEFT, and MENU RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- AC voltage and frequency: according to country's standard.
- Connect the television set to the AC power via an isolation transformer.
- Allow the television set to warm up for approximately 20 minutes.
- Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use heatsinks as ground.
- Test probe: Ri > 10 M ohm; Ci < 2.5 pF.
- Use an isolated trimmer/screwdriver to perform the alignments.

8.2 Hardware Alignments

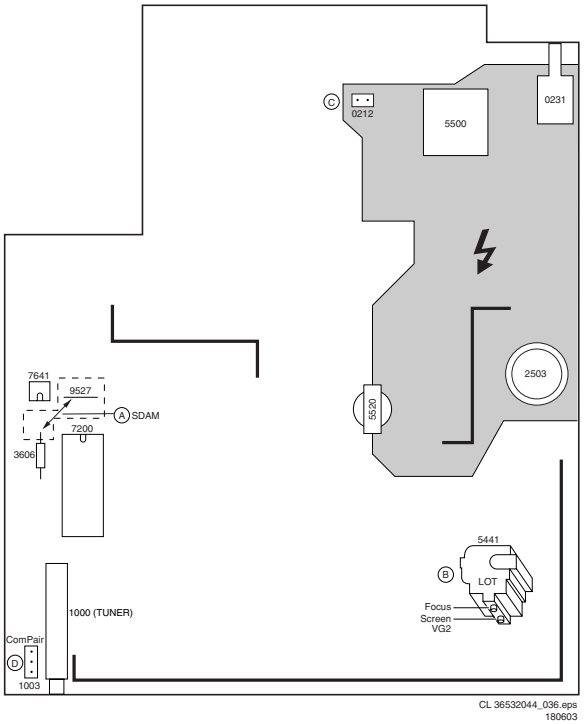


Figure 8-1 Top view family board

8.2.1 Vg2 Adjustment

1. Activate SDAM by pressing the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the WHITE TONE sub menu.
3. Press the MENU LEFT/RIGHT key to enter the WHITE TONE sub menu.
4. In the WHITE TONE sub menu, press the MENU UP/DOWN keys to select NORMAL RED, NORMAL GREEN, or NORMAL BLUE.
5. Use the MENU LEFT/RIGHT keys to set the values of NORMAL RED, NORMAL GREEN and NORMAL BLUE to '40'.
6. Press the MENU button twice to enter the normal user menu.
7. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
8. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
9. Use the MENU UP/DOWN keys to select CONTRAST. Be sure to record the current value of CONTRAST.
10. Use the MENU LEFT/RIGHT keys to set the value of CONTRAST to '0'.
11. Use the MENU UP/DOWN keys to select BRIGHTNESS. Be sure to record the current value of BRIGHTNESS.
12. Use the MENU LEFT/RIGHT keys to set the value of BRIGHTNESS to minimum (OSD just visible in a dark room).
13. Press the MENU button twice to return to the top level SDAM menu.
14. Press the OSD/STATUS button to hide the SDAM onscreen display ("S" indication remains visible). This, to avoid interferences during the waveform measurements
15. Connect the RF output of a video pattern generator to the antenna input, and input a 'black picture' test pattern to the television set.
16. Set the oscilloscope to 50 V/div and the time base to 0.2 milliseconds (external triggering on the positive vertical pulse with a 10:1 probe).
17. Ground the scope at the CRT panel and connect a 100:1 probe to one of the cathodes of the picture tube socket (pin 7= Red, pin 9= Green, and pin 3= Blue, see also schematic diagram B1). Measure the level of the black current measuring pulses. These are the second line (Red), third line (Green), and fourth line (Blue) directly after the frame blanking (see figure "V_cut-off").
    Remark: This chassis is using a TDA93XX UOC series. These use two different measuring pulses at each of the R, G, and B outputs. The above-mentioned level applies to the pulse with the lowest level of each gun.
18. Select the cathode with the highest V_dc value for the alignment. Adjust the V_cut-off of this gun with the SCREEN potentiometer (see figure "Top view family board") on the LOT to the correct value (see table "Vg2 alignment values").
19. Press the OSD/STATUS button to display the SDAM onscreen display.
20. Press the MENU button to enter the normal user menu.
21. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
22. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
23. Use the MENU UP/DOWN keys to select CONTRAST.
24. Use the MENU LEFT/RIGHT keys to reset the value of CONTRAST to the original value.
25. Use the MENU UP/DOWN keys to select BRIGHTNESS.
26. Use the MENU LEFT/RIGHT keys to reset the value of BRIGHTNESS to the original value.
27. Press the MENU button twice to return to the top level SDAM menu.
28. Use the POWER button on the remote control transmitter or the POWER button on the television set to turn off the television set. This will save the changes made in SDAM.

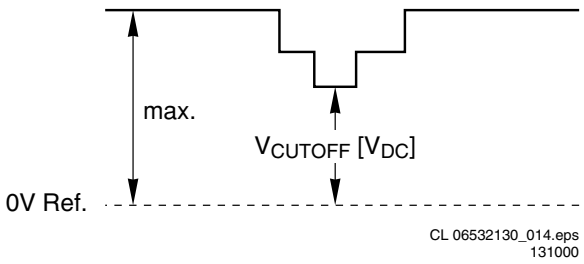


Figure 8-2 V_cutoff

Table 8-1 Vg2 alignment values

Screen Size	Cut-off point (V)
14RF	+135 V ± 4 V
20V	+140 V ± 4 V
20RF	+140 V ± 4 V
27V	+140 V ± 4 V

8.2.2 Focusing

1. Connect the RF output of a video pattern generator to the antenna input.
2. Input a circle or crosshatch test pattern to the television set.
3. Press the SMART PICTURE button on the remote control transmitter repeatedly to choose NATURAL (or MOVIES) picture mode.
4. Adjust the FOCUS potentiometer (see figure "Top view family board") until the vertical lines near the left and right sides of the screen, and near the horizontal center of the screen, are at minimum width without visible haze.

8.3 Software Alignments and Settings

The following options are performed in the Service Default Alignment Mode (SDAM). SDAM is described in the "Service Modes, Error Codes and Fault Finding" section.
The following alignments are explained:
1. OPTIONS
2. TUNER
3. WHITE TONE
4. GEOMETRY
5. AUDIO

8.3.1 OPTIONS

Options are used to control the presence or absence of certain features and hardware.

Note: Each option byte controls several features of the television set; therefore, before changing option byte information, it is important to record the current option byte values. This ensures that the television features can be restored to the original settings, if necessary.

How to Change an Option Byte
An Option Byte represents a number of different options. Changing these bytes directly makes it possible to set all options very fast. All options are controlled via seven option bytes. Select the option byte (OP 1.. OP 7) with the MENU UP/DOWN keys, and enter the new value.

1. Activate SDAM by pressing the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the OPTIONS sub menu.
3. Press the MENU LEFT or MENU RIGHT key to enter the OPTIONS sub menu.
4. In the OPTIONS sub menu, press the MENU UP/DOWN keys to select 'OP 1' through 'OP 7'.
5. Use the number keys on the remote control transmitter to enter a new value for the selected option byte. The value must be entered as a three-digit value (for example, '4' would be entered as '0 0 4').
6. The selected value must be between '0' and '255'.
7. When all desired changes to the option bytes are made, press the MENU button to return to the top level SDAM menu. This will save changes to the option byte settings.
8. To ensure the option byte changes take effect:
   – Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
   – Disconnect the television set from AC power for at least ten seconds.
   – Reconnect the television set to AC power.
   – Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

Leaving the OPTION submenu saves the changes in the Option Byte settings. Some changes will only take effect after the set has been switched OFF and ON with the mains switch (cold start).

How to Calculate the Value of an Option Byte
Calculate an Option Byte value (OP 1 .. OP 7) in the following way:
1. Check the status of the single option bits (OB): are they enabled (1) or disabled (0).
2. When an option bit is enabled (1), it represents a certain value (see first column "value between brackets" in table below). When an option bit is disabled, its value is 0.
3. The total value of an Option Byte is formed by the sum of its eight option bits. See second table below for the correct Option Bytes per type number.

Bit (value)	OP1	OP2	OP3	OP4	OP5	OP6	OP7
0 (1)	OB10	OB20	OB30	OB40	OB50	OB60	OB70
1 (2)	OB11	OB21	OB31	OB41	OB51	OB61	OB71
2 (4)	OB12	OB22	OB32	OB42	OB52	OB62	OB72
3 (8)	OB13	OB23	OB33	OB43	OB53	OB63	OB73
4 (16)	OB14	OB24	OB34	OB44	OB54	OB64	OB74
5 (32)	OB15	OB25	OB35	OB45	OB55	OB65	OB75
6 (64)	OB16	OB26	OB36	OB46	OB56	OB66	OB76
7 (128)	OB17	OB27	OB37	OB47	OB57	OB67	OB77
Total:	**Sum**	**Sum**	**Sum**	**Sum**	**Sum**	**Sum**	**Sum**

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Figure 8-3 Option Byte calculation

Table 8-2 Options settings

Typenumber	OP1	OP2	OP3	OP4	OP5	OP6	OP7
20L140/37C	65	215	65	162	196	201	0
20L145/37C	65	215	65	162	196	201	0
14RFL150/37C	65	215	65	162	196	201	0
20PT6331/37C	65	215	65	162	192	201	0
20PT6431/37C	65	215	65	162	204	201	0
20MS3341/37C	65	215	65	2	192	73	0
20PT6341/37	65	215	65	162	204	201	0
20PT5441/37	65	215	65	162	204	201	0
14PT6441/37	65	215	65	162	204	201	0
27PT5445/37	65	215	65	130	204	201	0
27MT3305/17	65	211	65	2	196	201	0

Option Bit Assignment
Following are the option bit assignments for all L03 software clusters.

Table 8-3 Option Bit Assignment

Option Byte		Option Bit Definition			
OP #		**Assignment**	**Bit = [0]**	**Bit = [1]**	**Default setting**
1	**OBx0**	CHINA or NTSC_ONLY	Tuning is not for China set or NTSC only set, or this option bit is not applicable	Tuning is for China set or NTSC only set	LATAM & NAFTA: 0 for other sets, 1
	OBx1	VIRGIN_MODE	Virgin mode is disabled or not applicable	Virgin mode is enabled. Plug and Play menu item will be displayed to perform installation at the initial startup of the TV when VIRGIN_MODE is set to 1. After installation is finished, this option bit will be automatically set to 0	LATAM & NAFTA: 0
	OBx2	UK_PNP	UK's default Plug and Play setting is not available or not applicable	UK's default Plug and Play setting is available. When UK_PNP and VIRGIN_MODE are set to 1 at the initial setup, LANGUAGE = ENGLISH, COUNTRY = GREAT BRITAIN and after exiting from menu, VIRGIN_MODE will be set automatically to 0 while UK_PNP remains 1	LATAM & NAFTA: 0
	OBx3	ACI	ACI feature is disabled or not applicable	ACI feature is enabled	LATAM & NAFTA: 0.
	OBx4	ATS (EU), or FINE_TUNING (NAFTA), or LANGUAGE_MALAY (AP)	Feature is disabled or not applicable	Feature is enabled	LATAM & NAFTA: 0
	OBx5	LNA	Auto Picture Booster is not available or not applicable	Auto Picture Booster is available	LATAM & NAFTA: 0
	OBx6	FM_RADIO	FM radio feature is disabled or not applicable	FM radio feature is enabled	LATAM & NAFTA: 0
	OBx7	PHILIPS_TUNER	ALPS / MASCO compatible tuner is in use	Philips compatible tuner is in use	LATAM & NAFTA: 0
2	**OBx0**	HUE	Hue/Tint Level is disabled or not applicable	Hue/Tint Level is enabled	LATAM & NAFTA: 1
	OBx1	COLOR_TEMP	Color Temperature is disabled or not applicable	Color Temperature is enabled	LATAM & NAFTA: 1
	OBx2	CONTRAST_PLUS	Contrast+ is disabled or not applicable	Contrast+ is enabled	LATAM & NAFTA: 1
	OBx3	TILT	Rotate Picture is disabled or not applicable	Rotate Picture is enabled	LATAM & NAFTA: 0
	OBx4	NOISE_REDUCTION	Noise Reduction (NR) is disabled or not applicable	Noise Reduction (NR) is enabled	LATAM & NAFTA: 0
	OBx5	CHANNEL_NAMING	Name FM Channel is disabled or not applicable	Name FM Channel is enabled	LATAM & NAFTA: 0. (**Note:** Name FM channel can be enabled only when FM_RADIO= 1)
	OBx6	SMART_PICTURE	Smart Picture is disabled or not applicable	Smart Picture is enabled	LATAM & NAFTA: 1
	OBx7	SMART_SOUND	Smart Sound is disabled or not applicable	Smart Sound is enabled	LATAM & NAFTA: 0 for mono sets, 1 for stereo sets.
3	**OBx0**	AVL	AVL is disabled or not applicable	AVL is enabled	LATAM & NAFTA: 1
	OBx1	WSSB or HOME_CINEMA	WSSB is disabled or not applicable	WSSB is enabled	LATAM & NAFTA: 0. (**Note:** This option bit can be set to 1 only when WIDE_SCREEN= 1)
	OBx2	WIDE_SCREEN	Software is used for 4:3 set or not applicable	Software is used for 16:9 set	LATAM & NAFTA: 0
	OBx3	Virtual Dolby			LATAM & NAFTA: 1
	OBx4	MSP34X5_VOL_CTRL			LATAM & NAFTA: 0. (**Note:** For 2 x 10 W sets only)
	OBx5	COMPRESS_16_9	COMPRESS 16:9 selection is not applicable. Item should not be in the FORMAT menu list	COMPRESS 16:9 selection is applicable. Item should not be in the FORMAT menu list	LATAM & NAFTA: 0
	OBx6	EXPAND_4_3	Expand 4:3 selection is not applicable. Item should not be in the FORMAT menu list,	Expand 4:3 selection is applicable. Item should be in the FORMAT menu list	LATAM & NAFTA: 1
	OBx7	EW_FUNCTION	EW function is disabled. In this case, only Expand 4:3 is allowed, Compress 16:9 is not applicable	EW function is enabled. In this case, both Expand 4:3 and Compress 16:9 are applicable.	LATAM & NAFTA: 0
4	**OBx0**	STEREO_NON_DBX	For AP_NTSC, chip TDA 9853 is not present	For AP_NTSC, chip TDA 9853 is present	LATAM & NAFTA: 0 for mono sets, 1 for stereo sets.
	OBx1	STEREO_DBX	For AP_NTSC, chip MSP 3445 is not present	For AP_NTSC, chip MSP 3445 is present	LATAM & NAFTA: 0
	OBx2	STEREO_PB or KOREAN_2CS	For AP_PAL, chip MSP3465 is not present	For AP_PAL, chip MSP3465 is present	LATAM & NAFTA: 0
	OBx3	STEREO_NICAM_2CS	For EU and AP_PAL, chip MSP 3415 is not present	For EU and AP_PAL, chip MSP 3415 is present	LATAM & NAFTA: 0
	OBx4	OB44: DELTA_VOLUME	Delta Volume Level is disabled or not applicable	Delta Volume Level is enabled	
	OBx5	OB45: ULTRA_BASS	Ultra Bass is disabled or not applicable	Ultra Bass is enabled	LATAM & NAFTA: 0 for mono sets, 1 for stereo sets
	OBx6	VOLUME_LIMITER	Volume Limiter Level is disabled or not applicable	Volume Limiter Level is enabled	LATAM & NAFTA: 0
	OBx7	OB47: INCR_SUR	Incredible Surround feature is disabled	Incredible Surround feature is enabled	LATAM & NAFTA: 0 for mono sets, 1 for stereo sets.

Option Byte		Option Bit Definition			
5	OBx0	PIP or CLOCK	Feature is disabled or not applicable	Feature is enabled	LATAM & NAFTA: 0
	OBx1	HM	HM is disabled or not applicable	HM is enabled	LATAM & NAFTA: 0 for stereo sets, 1 for mono sets.
	OBx2	SVHS	SVHS source is not available	SVHS source is available	LATAM & NAFTA: 0. (Note: This option bit is not applicable for EU)
	OBx3	CVI	CVI source is not available	CVI source is available	
	OBx4	AV3	Side/Front AV3 source is not present	Side/Front AV3 source is present	LATAM & NAFTA: 0.
	OBx5	AV2	AV2 source is not present	AV2 source is present	LATAM & NAFTA: 0. (**Note:** For EU, when AV2=1, both EXT2 and SVHS2 should be included in the OSD loop)
	OBx6	AV1	AV1 source is not present	AV1 source is present	LATAM & NAFTA: 1
	OBx7	NTSC_PLAYBACK	NTSC playback feature is not available	NTSC playback feature is available	LATAM & NAFTA: 1
6	OBx0	BASS_TREBLE	Feature is not available	Feature is available	LATAM & NAFTA: 0 for mono sets, 1 for stereo sets
	OBx1	SMART_TEXT	Smart Text Mode and Favorite Page are disabled or not applicable	Smart Text Mode and Favorite Page are enabled	LATAM & NAFTA: 0
	OBx2	SMART_LOCK	Child Lock and Lock Channel are disabled or not applicable for EU	Child Lock and Lock Channel are enabled for EU	LATAM & NAFTA: 1
	OBx3	VCHIP (LATAM & NAFTA & NAFTA) / TXT_1PG (EU)	Feature is disabled	Feature is enabled	LATAM & NAFTA: 0.
	OBx4	WAKEUP_CLOCK	Wake up clock feature is disabled or not applicable	Wake up clock feature is enabled	LATAM & NAFTA: 0
	OBx5	SMART_CLOCK	Smart Clock Using Teletext and Smart Clock Using PBS is disabled or not applicable	Smart Clock Using Teletext and Smart Clock Using PBS is enabled. For NAFTA, menu item AUTOCHRON is present in the INSTALL submenu	LATAM & NAFTA: 0
	OBx6	SMART_SURF	Smart Surf feature is disabled or not applicable	Smart Surf feature is enabled	LATAM & NAFTA: 1
	OBx7	PERSONAL_ZAPPING	Personal Zapping feature is disabled or not applicable	Personal Zapping feature is enabled	LATAM & NAFTA: 0
7	OBx0	SYSTEM_LT_1 and SYSTEM_LT_2	These two option bits are allocated for LATAM system selection. (00: NTSC-M ; 01: NTSC-M, PAL-M ; 10: NTSC-M, PAL-M, and PAL-N ; 11: NTSC-M, PAL-M, PAL-N, and PAL-BG)		
	OBx1				
	OBx2	SOUND_SYSTEM_AP	OB70,OB71,OB72;These three option bits are allocated for AP_PAL sound system selection. (000: BG ; 001: BG / DK ; 010: I / DK ; 011: BG / I / DK ; 100: BG / I / DK / M)		
	OBx3	COLOR_SYSTEM_AP (This option bit is allocated for AP-PAL color system selection)	Auto, PAL 4.43, NTSC 4.43, and NTSC 3.58	Auto, PAL 4.43, NTSC 4.43, NTSC 3.58, and SECAM	LATAM & NAFTA: 0
	OBx4	SIGNAL_STRENGTH / DVD WAKEUP TIMER (DVD COMBI), 3D_COMBFILTER (NAFTA)			LATAM & NAFTA: 1.
	OBx5	LNA_PP (for L01 AP cluster), VOICE_CONTROL			LATAM & NAFTA: 0
	OBx6	ACTIVE_CONTROL			LATAM & NAFTA: 1
	OBx7	TIME_WIN1	The time window is set to 1.2 s	The time window is set to 2 s	LATAM & NAFTA: 0 (**Note:** The time-out for all digit entries depends on this setting)

8.3.2 TUNER

Note: Described alignments are only necessary when the NVM (part reference number 7641) is replaced.

IFPLL

This adjustment is auto-aligned. Therefore, no action is required (default= "30").

AGC (AGC take over point)

1. Connect the RF output of a video pattern generator to the antenna input.
2. Input a color bar test pattern to the television set.
3. Set the amplitude of the video pattern generator to 10 mV and set the frequency to 475.25 MHz (PAL/SECAM) or 61.25 MHz (NTSC).
4. Connect a DC multimeter to pin 1 of the tuner (item 1000 on the main chassis).
5. Activate SDAM by pressing the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
6. Use the MENU UP/DOWN keys to highlight the TUNER sub menu.
7. Press the MENU LEFT/RIGHT keys to enter the TUNER sub menu.
8. Use the MENU UP/DOWN keys to select AGC.
9. Use the MENU LEFT/RIGHT keys to adjust the AGC value (default value is "32") until the DC-voltage at pin 1 of the tuner lies is 3.3 V.
10. Press the MENU button to return to the top level SDAM menu.
11. To ensure the AGC change takes effect:
    - Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
    - Disconnect the television set from AC power for at least ten seconds.

– Reconnect the television set to AC power.
– Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

SL (Slicing Level)
This adjustment sets the sync slicing level for non-standard signals. You must turn it 'on' to have no picture instability in premium decoded cable channels.
- OFF: slicing level dependent on noise level.
- ON: fixed slicing level of 70 %.

To adjust SL:
1. Activate SDAM by pressing the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the TUNER sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the TUNER sub menu.
4. Use the MENU UP/DOWN keys to select SL.
5. Use the MENU LEFT/RIGHT keys to toggle SL 'Off' and 'On'.
6. Press the MENU button to return to the top level SDAM menu.
7. To ensure the SL setting is saved:
   – Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
   – Disconnect the television set from AC power for at least ten seconds.
   – Reconnect the television set to AC power.
   – Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

CL (Cathode Drive Level)
Fixed value is "7".

8.3.3 WHITE TONE

The values of the 'black cut-off level' can be adjusted in the 'WHITE TONE' sub menu.
Normally, no alignment is needed for 'WHITE TONE', and the given default values are used.

Default settings for **NORMAL** (color temperature= 11500 K):
NORMAL RED = 22
NORMAL GREEN = 21
NORMAL BLUE = 26

To adjust NORMAL RED, NORMAL GREEN, and NORMAL BLUE:
1. Connect the RF output of a video pattern generator (e.g. PM5418) to the antenna input.
2. Set the amplitude of the video pattern generator to at least 1 mV and set the frequency to 475.25 MHz (PAL/SECAM) or 61.25 MHz (NTSC).
3. Input a "100 IRE white" pattern to the television set.
4. Activate SDAM by pressing the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
5. Use the MENU UP/DOWN keys to highlight the WHITE TONE sub menu.
6. Press the MENU LEFT/RIGHT keys to enter the WHITE TONE sub menu.
7. Use the MENU UP/DOWN keys to select NORMAL RED, NORMAL GREEN, or NORMAL BLUE.
8. Set the Minolta CA100 color analyzer (or equivalent) in RGB mode, and set all color temperature settings to their default values.
9. Place the color sensor of the meter in the middle of the screen.
10. Set the meter in "T-dUV-Y" mode, and set CONTRAST to make the light output "Y" on the meter 90 nit ± 15%
11. Use the MENU LEFT/RIGHT keys to adjust the value of NORMAL GREEN and/or NORMAL BLUE.
12. When all desired changes to the WHITE TONE sub menu values are made, press the MENU button to return to the top level SDAM menu.
13. To ensure the WHITE TONE settings are saved:
   – Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
   – Disconnect the television set from AC power for at least ten seconds.
   – Reconnect the television set to AC power.
   – Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

8.3.4 GEOMETRY

Introduction
The geometry alignment menu contains several items for correct picture geometry alignment.

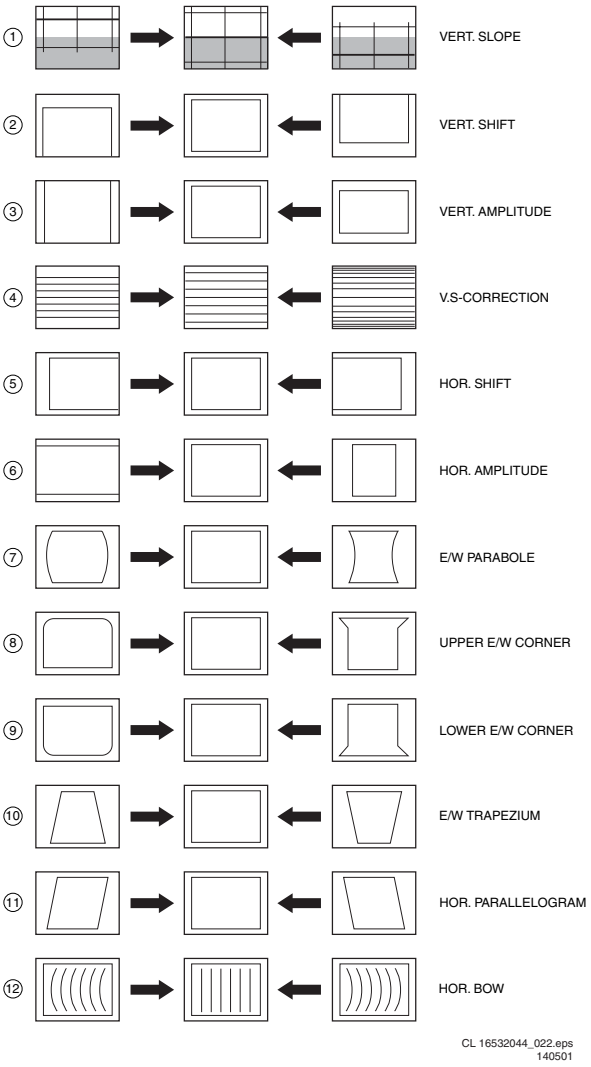


Figure 8-4 Geometry alignments

1. Connect the RF output of a video pattern generator to the antenna input.
2. Input a crosshatch test pattern to the television set.
3. Set the amplitude of the video pattern generator to at least 1 mV and set the frequency to 475.25 MHz (PAL/SECAM) or 61.25 MHz (NTSC).

4. Press the SMART PICTURE button on the remote control transmitter repeatedly to choose PERSONAL or MOVIES picture mode.
5. Activate SDAM by pressing the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
6. Use the MENU UP/DOWN keys to highlight the GEOMETRY sub menu.
7. Press the MENU LEFT/RIGHT keys to enter the GEOMETRY sub menu.
8. Use the MENU UP/DOWN keys to highlight either the HORIZONTAL sub menu or the VERTICAL sub menu.
9. Press the MENU LEFT/RIGHT keys to enter either the HORIZONTAL sub menu or the VERTICAL sub menu.
10. Use the MENU UP/DOWN keys to select items in the HORIZONTAL sub menu or the VERTICAL sub menu.
11. Use the MENU LEFT/RIGHT keys to adjust the values of items in the HORIZONTAL and VERTICAL sub menus.
12. When all desired changes to the HORIZONTAL and VERTICAL sub menu values are made, press the MENU button twice to return to the top level SDAM menu.
13. To ensure the GEOMETRY settings are saved:
    – Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
    – Disconnect the television set from AC power for at least ten seconds.
    – Reconnect the television set to AC power.
    – Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

The following alignments can be performed in the GEOMETRY sub menu:

Horizontal Alignments:
- Horizontal Shift (HSH). Select Horizontal Shift to canter the picture on the screen.
- Picture Width (PW). Aligns the width of the picture.

Vertical Alignments:
- Vertical slope (VSL). Aligns the picture so the proportions are the same at the top and bottom of the screen. This alignment must be performed first, before all other vertical alignments. Turning SBL, 'on' will assist in performing this alignment.
- Vertical Amplitude (VAM). Aligns the height of the picture (other vertical alignments are NOT compensated).
- Vertical S-Correction (VSC). Aligns the vertical linearity, so that the vertical intervals of the grid-patterns are the same over the entire height of the screen.
- Vertical Shift (VSH). Aligns the vertical center of the picture to the vertical center of the CRT. After performing this alignment, it may be necessary to perform the VAM alignment again.
- Service blanking (SBL). Turns the blanking of the lower half of the screen 'on' or 'off' (to be used in combination with the vertical slope alignment).

Methods of Adjustment

Vertical Amplitude and Position
1. Select SERVICE BLANKING (SBL) and set it to 1. The lower half of the picture will be blanked.
2. Press the MENU UP/DOWN buttons to select VERTICAL SLOPE (VSL).
3. Align VSL to start the blanking exactly at the horizontal white line at the canter of the test circle (align the bottom of the screen so that castellations just disappear).
4. Press the MENU UP/DOWN buttons to select SBL and set it back to 0. The full picture reappears.
5. Select VERTICAL AMPLITUDE (VAM) and align the picture height to approximately 13.0 - 13.1 blocks (align the top of the screen so that castellations just disappear).
6. Select VERTICAL SHIFT (VSH) and align for vertical centering of the picture on the screen.
7. Repeat the last two steps if necessary.

Horizontal Phase
1. Set PW to "0".
2. Select Horizontal Shift (HSH) to center the picture on the screen.

Horizontal and Vertical Shift Offset for NTSC (TRINOMA and PAL chassis)
1. Align the set for VSH and HSH (according to above mentioned procedures) with a PAL system signal.
2. Change the signal to NTSC system and adjust HORIZONTAL SHIFT OFFSET (H60) and VERTICAL SHIFT OFFSET (V60) to center the picture on the screen.
3. Repeat if necessary.

The table below lists the default GEOMETRY values for the different television sets.

Table 8-4 Default geometry values

Alignment	Description	Value
PW 31	Picture Width	1F
HSH	Horizontal Shift	35
VSL	Vertical Slope	33
VAM	Vertical Amplitude	26
VSC	Vertical S orrection	23
VSH	Vertical Shift	31

8.3.5 AUDIO

Necessary measuring equipment:
- MTS (Multi-channel Television Sound) generator (e.g. Fluke 54200).
- AC millivolt meter.

ILA (Input Level Alignment)
1. Activate SDAM by pressing the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the AUDIO sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the AUDIO sub menu.
4. Use the MENU UP/DOWN keys to select ILA.
5. Apply a BTSC sound signal with a signal strength of 60 dBuV (1 mV_rms) to the aerial input. Measure the output on pin 21 (L_OUT) of IC7841 with an AC millivoltmeter **via a Low Pass Filter** (R= 10 kohm, C= 1.5 nF, measure on the capacitor).
6. Use the MENU LEFT/RIGHT keys to adjust the meter reading to 106 mV_rms ± 2 mV_rms (default ILA value is "31").
7. Press the MENU button to return to the top level SDAM menu.
8. To ensure the ILA setting is saved:
    – Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
    – Disconnect the television set from AC power for at least ten seconds.
    – Reconnect the television set to AC power.
    – Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

LSA (Low Separation Alignment)
1. Activate SDAM by pressing the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed

by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the AUDIO sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the AUDIO sub menu.
4. Use the MENU UP/DOWN keys to select LSA.
5. Apply a 300 Hz BTSC sound signal with a signal strength of 60 dBuV (1 mV_rms) to the aerial input (only the left channel of the stereo signal). Measure the output on pin 22 (R_OUT) of IC7841 with an AC millivoltmeter.
6. Use the MENU LEFT/RIGHT keys to adjust the meter reading to a minimum value (default LSA value is "7" for stereo sets, and "0" for mono sets).
7. Press the MENU button to return to the top level SDAM menu.
8. To ensure the LSA setting is saved:
   – Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
   – Disconnect the television set from AC power for at least ten seconds.
   – Reconnect the television set to AC power.
   – Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard.

HSA (High Separation Alignment)

1. Activate SDAM by pressing the following key sequence on the remote control transmitter: 0 6 2 5 9 6 directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
2. Use the MENU UP/DOWN keys to highlight the AUDIO sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the AUDIO sub menu.
4. Use the MENU UP/DOWN keys to select HSA.
5. Apply a 3 kHz BTSC sound signal with a signal strength of 60 dBuV (1 mV_rms) to the aerial input (only the left channel of the stereo signal). Measure the output on pin 22 (R_OUT) of IC7841 with an AC millivoltmeter.
6. Use the MENU LEFT/RIGHT keys to adjust the meter reading to a minimum value (default HSA value is "31").
7. Press the MENU button to return to the top level SDAM menu.
8. To ensure the HSA setting is saved:
   – Turn the television set 'off' by using the 'POWER' button on the remote control transmitter or the local keyboard.
   – Disconnect the television set from AC power for at least ten seconds.
   – Reconnect the television set to AC power.
   – Turn the television set 'on' by using the 'POWER' button on the remote control transmitter or the local keyboard

9. Circuit Descriptions, List of Abbreviations, and IC Data Sheets

Index of this chapter:

Notes:

- Only **new** circuits (compared to the L01.2 chassis) are described in this chapter. For the other circuit descriptions, see the manual of the L01.2L AA. This manual is available in different languages:
  - 3122 785 11800 = Spanish.
  - 3122 785 11820 = Portuguese.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the block diagram in chapter 6, and/or the electrical diagrams in chapter 7. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The "L03"' chassis is a global TV chassis for the model year 2003 and is used for TV sets with screen sizes from 14 inch to 21 inch, in Super Flat and Real Flat executions. In comparison to its predecessor (the "L01"), this chassis is further simplified: it contains economized executions of the power supply, the video processing (microprocessor), and the audio processing.

The standard architecture consists of a Main panel (called "family board"), a Picture Tube panel, a Side I/O panel, and a Top Control panel. The Main panel consists primarily of conventional components with some surface mounted devices in the audio and video processing part.

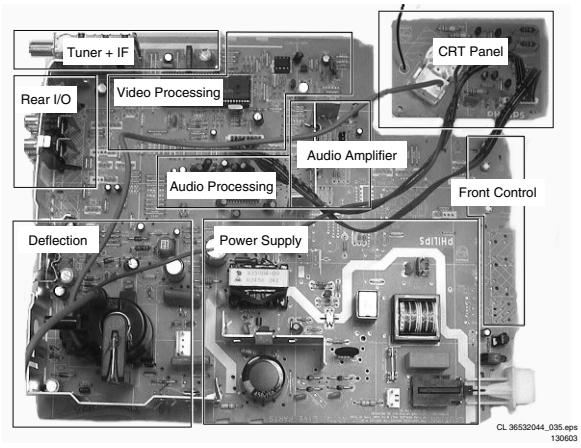


Figure 9-1 Top view family board

The functions for video processing, microprocessor (P), and CC/Teletext (TXT) decoder are combined in one IC (TDA937x), the so-called Ultimate One Chip (UOC). This chip is mounted on the component side of the main panel.

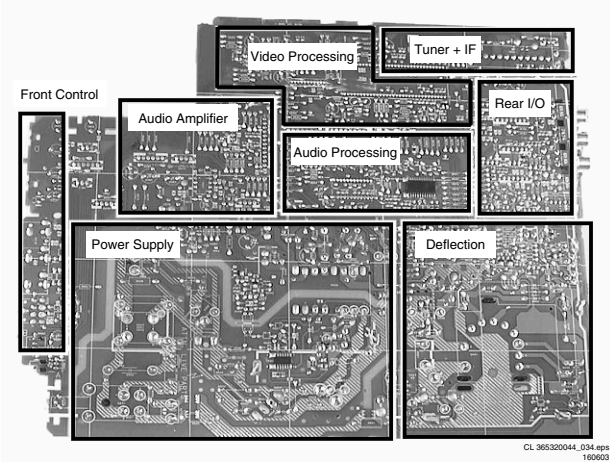


Figure 9-2 Bottom view family board

The L03 can be divided into two basic systems, i.e. mono and stereo sound. While the audio processing for the mono sound is done in the audio block of the UOC, external audio processing ICs are used for stereo sets.

The tuning system features 181 channels with on-screen display. The main tuning system uses a tuner, a microcomputer, and a memory IC mounted on the main panel. The microcomputer communicates with the memory IC, the customer keyboard, remote receiver, tuner, signal processor IC and the audio output IC via the I2C bus. The memory IC retains the settings for favorite stations, customer-preferred settings, and service / factory data.
The on-screen graphics and closed caption decoding are done within the microprocessor where they are added to the main signal.

The chassis uses a Switching Mode Power Supply (SMPS) for the main voltage source. The chassis has a 'hot' ground reference on the primary side and a cold ground reference on the secondary side of the power supply and the rest of the chassis.

9.2 Source Selection

The Source Select is divided mainly into two types, the "Mono Source Select" and the "Stereo Source Select".

- The Mono Source Select, both audio and video, will be done entirely by the UOC and will only be able to select one external audio source.
- As for the Stereo Source Select, the Panasonic IC, which is for BTSC decoding also, has 2 audio source inputs used for source selection, whereas the UOC will take care of the video selection.

9.2.1 Switching Function for Stereo I/O

Video Source Selection
The video source selection is done by the UOC. The video setting for LATAM / NAFTA is rather straightforward: a so-called "WYSIWYG" (what you see on the screen, is what you get from the video ouput).

Audio Source Selection
The AN5829 (BTSC decoder) device does the external stereo audio source selection. A maximum of three audio input sources can be selected. AV1 or FRONT is selected by the mechanical switch in the front cinch connector.

The selected external audio source is then fed to the AN5829 AUX1 input (pins 2 and 3). The AV2 is fed directly to AN5829 via AUX2 (pins 23 and 24). Then via I2C, the AN5829 IC source selection can be done.

9.2.2 Switching Function for Mono I/O

For the Mono configuration, only one input pin is available for the UOC.

Video Source Selection
The video switching is similar to the section above.

Audio Source Selection
The audio input (L1_IN) is connected to pin 35 of the UOC.

9.3 Audio

This chassis is targeted for the NAFTA market with Mono, Stereo, or SAP sound system.
For the "basic" Mono and Stereo sets, sound processing includes Volume control and AVL.
For stereo sets, IC AN5829S is the BTSC audio signal decoder and AN5891K is the audio processing IC.

9.3.1 Processing

This chassis uses the Intercarrier demodulation concept (one SAW filter for both video and audio). The base band (full bandwidth) BTSC audio signal from the UOC is fed to pin 14 of the stereo decoder. The Pilot detection and SAP detection registers indicate the type of transmitted audio signal such as Mono, Stereo, and/or SAP. Based on this indication, the software controls will help to output the appropriate audio signal at pins 21 and 22. The controls are done by the I2C bus connected to pins 18 and 19.
Internal or External audio (pins 2, 3, 23, and 24) can also be selected by the source selection register. For the selected audio source, the AGC function can be applied. The output is a fixed level output. The volume control function is available via the power amplifier (AN7522/23).

The selected audio output from IC7841 (AN5829) is fed to pins 3 and 22 of IC7821 (AN5891) for audio processing functions, such as Treble, Bass, Volume, Balance, and Surround sound functions. L_out and R_out are then available on pins 12 and 15.
IC7821 is also I2C controllable (pins 13 and 14). An AVL function is also available in this IC, and can be used for sets using this IC. In this case, the AVL function of the AN5829 is disabled. Subwoofer output (optional) is available on pin 20.

9.3.2 Amplifier

The output is fed to the audio amplifier (IC7901 for stereo sets or IC7902 for mono sets). This is a BTL amplifier (Bridge Tied Load), which is actually a class AB amplifier with four transistors for each channel. The advantage of BTL over the standard Class AB amplifier is that it requires a lower supply voltage to deliver a higher output.
The volume level is controlled at this IC (pin 9) by the "VOLUME" control line coming from the microprocessor. After amplification, the audio signal is send to the speaker / headphone output connector.

9.3.3 AVL (Automatic Volume Limiting)

The "Mono AVL" function operates via the UOC. During channel change and source selection, the AVL bit is to be switched "off" and then can resume to the previous state ("on/off") as shown in the timing diagram below.

The "Stereo AVL" function operates via the AGC control of IC AN5829S. During channel change and source selection, the AGC function is to be switched "off" and then can resume to the previous state ("on/off") as shown in timing diagram below.

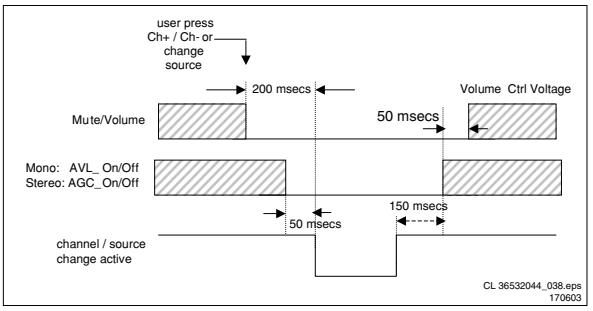


Figure 9-3 AVL timing diagram

9.3.4 Mute

The TV set must mute:
- Whenever a "User Mute" is activated.
- Whenever there is a channel change, RF to RF, RF to AV, AV to RF, and AV to AV (if any). In channel change, MUTE must be activated first before any other activity and un-MUTE must be done after every other activity has been completed.
- Whenever there is a loss in the signal.
- During cold or warm start, MUTE must be activated until all initialization processes are finished.
- When the set is going to STANDBY, MUTE must be activated first before any other activities.

Note:
1. MUTE mentioned above applies for the audio amplifier mute (= PWM volume control mute).
2. The first condition does not apply for the UOC, IC AN5891K, or IC AN5829S.
3. Above conditions refers to both mono and stereo sets.

9.4 Video

For a detailed circuit description of this part, we refer to the L01.2L AA manual (see the beginning of this chapter for the ordering codes). Please note that there can be minor differences in the text (e.g. other item numbers), but the described circuit principle is comparable.

This chassis uses the TDA937x family Ultimate One Chip TV processor (UOC), which is mounted in an SDIP 64 envelope. The various versions of the UOC series combine the function of a video processor together with a microcontroller and US Closed Caption/TXT decoder.

9.5 Synchronization

Inside IC7200 (part D) the vertical and horizontal sync pulses are separated. These "H" and "V" signals are synchronized with the incoming CVBS signal. They are then fed to the H- and V-drive circuits and to the OSD/TXT circuit for synchronization of the On Screen Display and Teletext (CC) information.

9.6 Deflection

For a detailed circuit description of this part, we refer to the L01.2L AA manual (see the beginning of this chapter for the ordering codes). Please note that there can be minor differences in the text (e.g. other item numbers), but the described circuit principle is comparable.

The L03 range consists of TV sets spanning from 14 to 21 inch using the same chassis architecture. For the chassis architecture, the CRTs used do not need East/West Correction. Therefore the geometry correction needed is horizontal shift, vertical slope, vertical amplitude, vertical S-correction, vertical shift and vertical zoom for geometry corrections (with the appropriate offsets required for NTSC channels on PAL sets).

9.7 Power Supply

For a detailed circuit description of this part, we refer to the L01.2L AA manual (see the beginning of this chapter for the ordering codes). Please note that there can be minor differences in the text (e.g. other item numbers), but the described circuit principle is comparable.

9.7.1 Introduction

The supply is a Switching Mode Power Supply (SMPS). The frequency of operation varies with the circuit load. This 'Quasi-Resonant Flyback' behavior has some important benefits compared to a 'hard switching' fixed frequency Flyback converter. The efficiency can be improved up to 90%, which results in lower power consumption. Moreover, the supply runs cooler and safety is enhanced.
The control IC in this power supply is the TEA1506 (L01= TEA1507). Unlike the TEA1507 control IC, the TEA1506 has no internal high voltage start-up source, and therefore needs to be started by means of an external bleeder resistor (R3506 and R3507). The operating voltage for the driver circuit is also taken from the 'hot' side of this transformer.
The switching regulator IC 7520 starts switching the FET 'on' and 'off', to control the current flow through the primary winding of transformer 5520. The energy stored in the primary winding during the 'on' time is delivered to the secondary windings during the 'off' time.
The "MainSupply" line is the reference voltage for the power supply. It is sampled by resistors 3543 and 3544 and fed to the input of the regulator 7540 / 6540. This regulator drives the feedback optocoupler 7515 to set the feedback control voltage on pin 6 of 7520.
The power supply in the set is "on" any time AC power is connected to the set.

9.7.2 Derived Voltages

The voltages supplied by the secondary windings of T5520 are:
- "MainSupply" for the horizontal output.
- "V_aux/V_audio" for the audio circuit.
- An optional "DVD_Supply" for future extensions.

Other voltages are provided by the LOT. It supplies -12 V, the tuner voltage, the filament voltage, and the +160 V source for the video drive. These secondary voltages of the LOT are monitored by the "EHT" lines.

9.8 Control

The microprocessor part of the UOC has the complete control and CC/Teletext processing on board. The User menu's and Service Default / Alignment Mode's are generated by the uP. Communication to other ICs is done via the I2C-bus.

9.8.1 I2C-Bus

The main control system, which consists of the microprocessor part of the UOC (7200), is linked to the external devices (Tuner, NVM, Audio ICs, etc) by means of the I2C-bus. An internal I2C-bus is used to control other signal processing functions, like video processing, sound IF, vision IF, synchronization, etc.

9.8.2 User Interface

The chassis uses a remote control with RC5 protocol. The incoming signal is connected to pin 67 of the UOC.
The keyboard, connected to UOC pin 8, can also control the set. Button recognition is done via a voltage divider.
The front LED (6691) is connected to an output control line of the microprocessor (pin 11). It is activated to provide the user information about whether or not the set is working correctly (e.g., responding to the remote control, normal operation (USA only) or fault condition)

9.8.3 I/O Selection

For the control of the input and output selections, there are three lines:

STATUS1
This signal provides information to the microprocessor on whether a video signal is available on the SCART1 AV input and output port (only for Europe). This signal is not connected in LATAM/NAFTA sets.

STATUS2
This signal provides information to the microprocessor on whether a video signal is available on the SCART2 AV input and output port (only for Europe).
For sets with an SVHS input it provides the additional information if a Y/C or CVBS source is present.
The presence of an external Y/C source makes this line 'high' while a CVBS source makes the line 'low'.

SEL_AV1_AV2
This is the source select control signal from the microprocessor. This control line is under user control or can be activated by the other two control lines.

9.8.4 Power Supply Control

The Power Supply is interfaced with the microcontroller (UOC) to provide the power supply with the control signals required for burst mode operation in standby and to vary the picture width by adjusting V_BAT.
The microprocessor part is supplied with 3.3 V and 8 V. The 3.3 V is derived from the "V_aux/V_audio" voltage via a 3V3 stabilizer (7493). The 8 V is derived from the 33V tuner voltage via TS7491 and TS7496.
Two signals are used to control the power supply: STD_CON and PW_ADJ.

STD_CON
This signal is generated by the microprocessor when over-current takes place at the "Main" line. This is done to enable the power supply into standby burst mode, and to enable this mode during a protection.
This is of logic "high" (3.3 V) under normal operation of the TV. When the TV set is in Standby (or fault) condition, this signal is a continuous pulse of 5 ms "low" (0 V) and 5 ms "high".
Note: In the L01 chassis this was inverted.

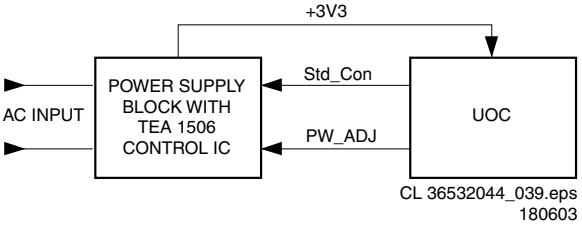


Figure 9-4 Block diagram of power supply interface with UOC

PW_ADJ
This signal is generated by the UOC through a PWM port. This PWM port is configured in Push Pull mode to generate a square wave signal of 0 to 100% duty cycle with a default value of 50% duty cycle.
PW_ADJ will eliminate tolerance and can adjust the picture wide slightly.

9.8.5 Protection Events

Several protection events are controlled by the UOC. In case one of these protections is activated, the set will go to "Standby" mode.

Deflection protections
The main protections for deflection are X-ray protection, frame amplifier failure detection, black current loop stability protection, and +8V auxiliary supply protection. For X-ray protection, the X-ray detection bit, XDT, must always be set to "1" (detection mode). High EHT protection must be triggered via software upon detection of the XPR bit switching to "1". A suitable number of checks are done before putting the set into protection mode in order to prevent false triggering.
For service requirements, the Enable Vertical Guard (RGB blanking), EVG, can be disabled (set to "0") although this is not necessary.

The following bits are monitored:
- SUP (Supply voltage indication)
- XPR (X-ray protection)
- EVG (Enable Vertical Guard)
- NDF (Output Vertical Guard)
- BCF (Black Current Failure)

I2C protection
To check whether all I2C IC's are functioning.

9.9 Abbreviation List

2CS	2 Carrier (or Channel) Stereo
ACI	Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AFT	Automatic Fine Tuning
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ATS	Automatic Tuning System
AV	External Audio Video
AVL	Automatic Volume Leveler
BCL	Beam Current Limitation
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
CC	Closed Caption
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
CVI	Component Video Input
DAC	Digital to Analogue Converter
DBX	Dynamic Bass Expander or noise reduction system in BTSC
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Direction For Use: description for the end user
DNR	Dynamic Noise Reduction
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EHT	Extra High Tension
EHT-INFO	Extra High Tension information
EPG	Electronic Programming Guide
EU	Europe
EW	East West, related to horizontal deflection of the set
EXT	External (source), entering the set via SCART or Cinch
FBL	Fast Blanking: DC signal accompanying RGB signals
FILAMENT	Filament of CRT
FM	Field Memory or Frequency Modulation
H	Horizontal sync signal
HP	Headphone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus
IF	Intermediate Frequency
IIC	Integrated IC bus

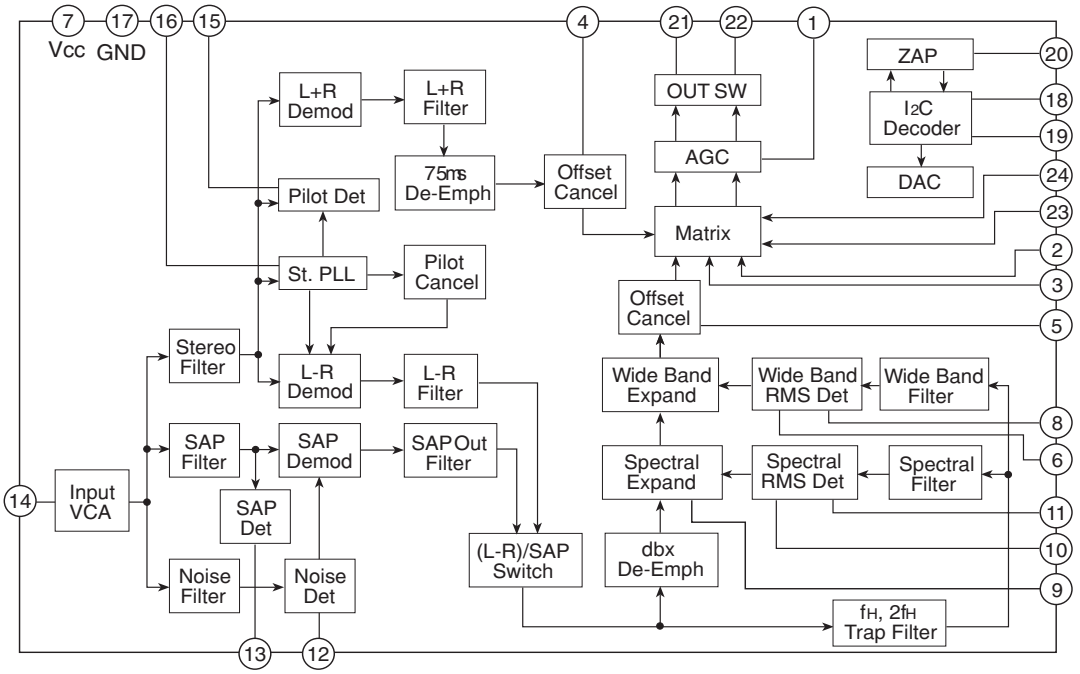
ITV	Institutional TV
LATAM	Latin American countries like Brazil, Argentina, etc.
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LS	Large Screen or Loudspeaker
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
OB	Option Bit
OC	Open Circuit
OP	Option Byte
OSD	On Screen Display
PAL	Phase Alternating Line. Color system mainly used in West Europe (color carrier = 4.433619 MHz) and South America (color carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit board
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POR	Power-On Reset
PTP	Picture Tube Panel (or CRT-panel)
RAM	Random Access Memory
RC	Remote Control handset
RGB	Red, Green, and Blue video signals
ROM	Read Only Memory
SDAM	Service Default / Alignment Mode
SAP	Second Audio Program
SC	Sandcastle: pulse derived from sync signals
S/C	Short Circuit
SCL	Serial Clock
SDA	Serial Data
SECAM	SEequence Couleur Avec Memoire. Color system mainly used in France and East Europe. Color carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SS	Small Screen
STBY	Standby
SVHS	Super Video Home System
SW	Software
THD	Total Harmonic Distortion
TXT	Teletext
uP	Microprocessor
UOC	Ultimate One Chip
V	Vertical sync signal
V_BAT	Main supply voltage for the deflection stage (mostly 141 V)
V-chip	Violence Chip
VCR	Video Cassette Recorder
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YC	Luminance (Y) and Chrominance (C) signal

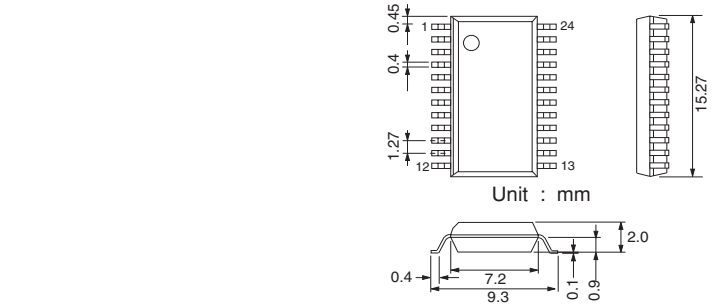
9.10 IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.10.1 Diagram A5, AN5829S (IC7841)

Block Diagram





24-Lead PANAFLAT Package (SO-24D)

Test Circuit

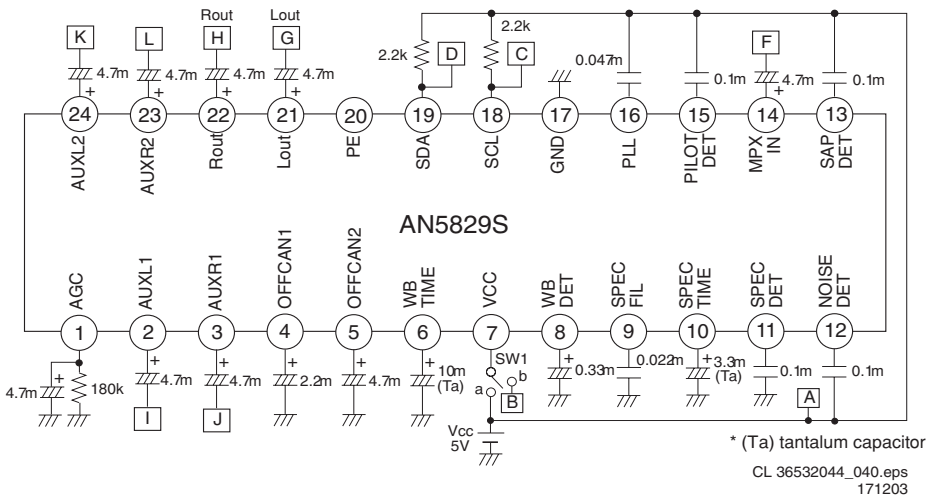


Figure 9-5 Internal Block Diagram and Pin Configuration

10. Spare Parts List

Not applicable

11. Revision List

Manual xxxx xxx xxxx.0
- First release.

Manual xxxx xxx xxxx.1
- information for 27V model added.

Manual xxxx xxx xxxx.2
- Table of contents updated with links.
- Some small text changes made.